

CIO

THE MAGAZINE FOR INFORMATION EXECUTIVES

FIRST OF TWO SECTIONS

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Hi, Technology!

Survival Tips To Help Nontechnical
CIOs Check In To The IT Function

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Davenport & Prusak
Book Excerpt: How Businesses
Build Knowledge

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ATM: Hot Stuff or
Back Burner?

PAGE 40

Bristol Hotels & Resorts
CIO Thomas Murphy works
to win wireheads' respect

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Windows NT

Exchange

SQL

Site

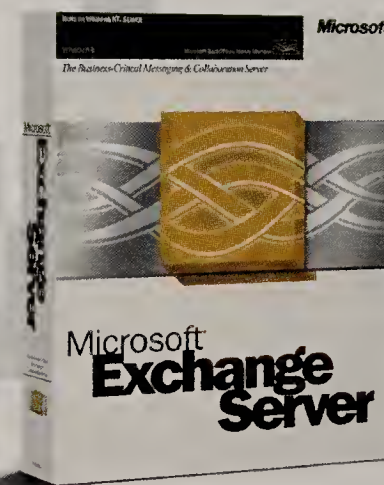
Systems Management

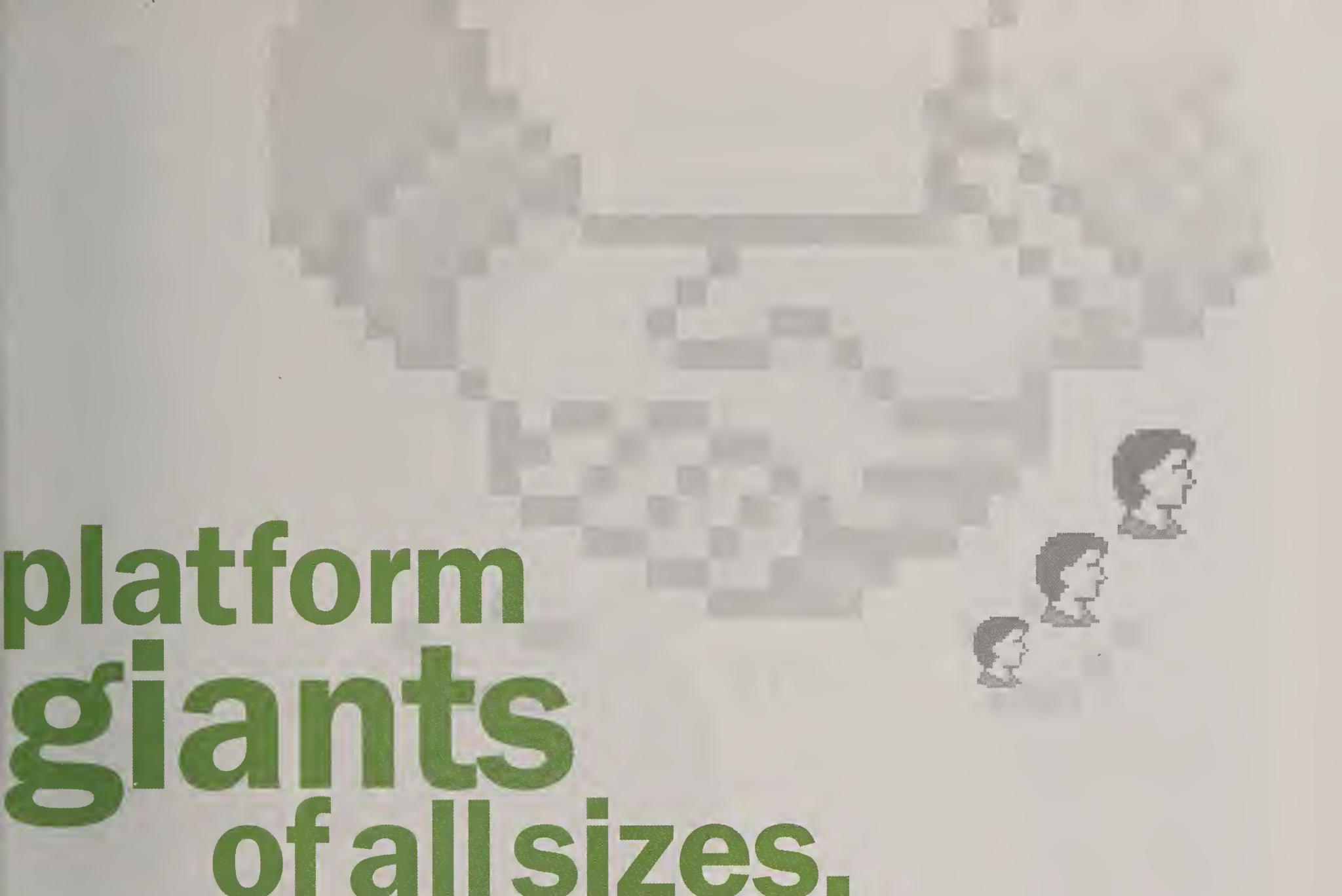
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Features

40 Are You Ready for ATM?

ATM UPDATE Asynchronous transfer mode can speed up multimedia applications, but not every company should rush to adopt it—yet.

By Tracy Mayor

52 Hi, Technology!

COVER STORY: CAREER MANAGEMENT

So you've just been introduced to your job as CIO and you're not exactly a technical wizard. To be successful, you don't have to pick up an engineering degree, but you do have to earn the respect of your IT colleagues.

By Mindy Blodgett

58 Know What You Know

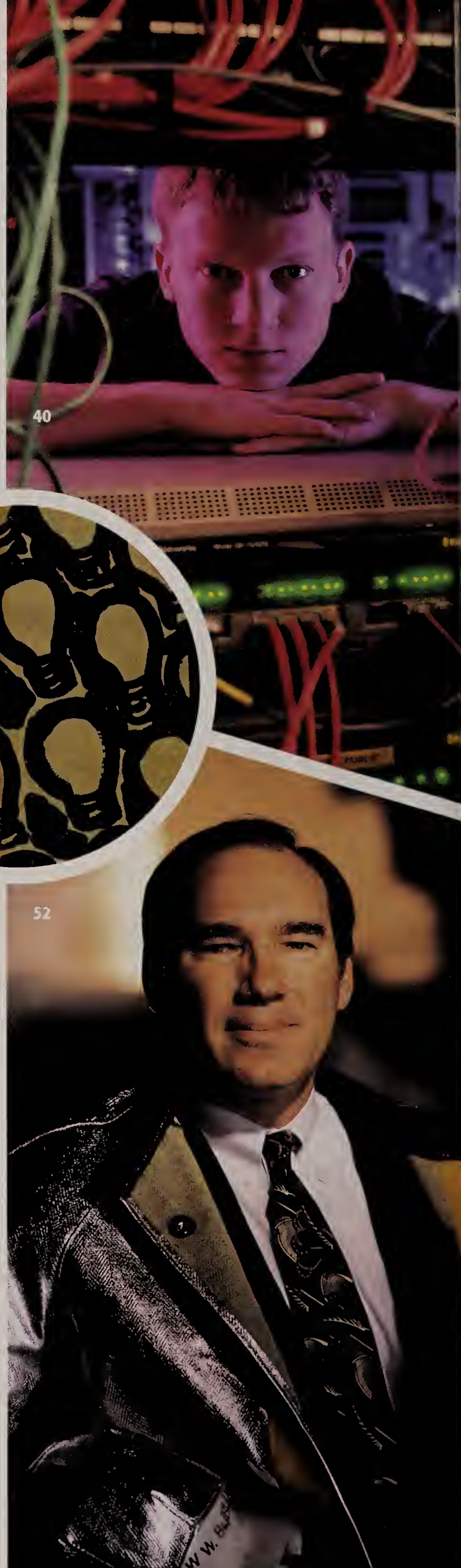
BOOK EXCERPT: WORKING KNOWLEDGE Learn how valuable corporate knowledge is acquired, created, bought, sold and bartered.

By Tom Davenport and Larry Prusak

ON THE COVER:

Bristol Hotels CIO Thomas Murphy has used his strategic vision to overcome his sparse technical background.

Cover photo by Wyatt McSpadden



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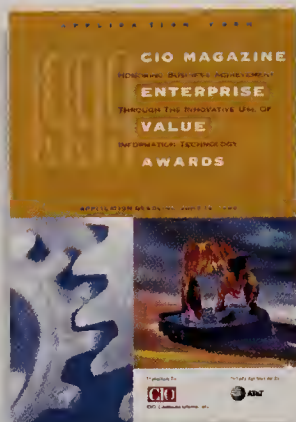
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Enterprise Value Awards application follows Page 68.



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EXECUTIVE COUNSEL In the office and beyond, the size of a company affects the life of a CIO. Find out which type fits your personality.

By Danielle Anderson

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IDC VIEW Charging back exact costs to internal customers within an organization may seem a best budgeting practice for IS, but a "rough justice" estimate might be the better way to count beans.

By Thomas D. Oleson

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EMERGING TECHNOLOGY Setting up your e-commerce system to be both accessible and protected is tricky business, but it's getting easier.

By John Edwards

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Inside Section 2

COVER STORY: SUPPLY CHAIN MANAGEMENT Companies are using new technologies to squeeze more time and money from the supply chain.

COMPETITIVE STRATEGIES In the battle to protect your intellectual capital, there are steps you can take to put up a good fight.

ACTIVITY-BASED MANAGEMENT BellSouth is using ABM to cope with the changed economics of deregulation.

MASS CUSTOMIZATION Delivering exactly what customers want can make for fatter profit margins, nimbler production lines and more satisfied customers.

REALITY BYTES Customer information software will bring you closer to your customers, but not without a lot of work.

INTELLECTUAL CAPITALISM European privacy protection laws could force U.S. companies to change the way they do business overseas.

LEARNING CURVE Building a solid infrastructure forces a company to pay attention to the basics.



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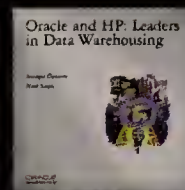
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LETTER FROM THE EDITOR

"Knowledge is as much an act or process as an artifact or thing." This statement, from *Working Knowledge: How Organizations Manage What They Know*, a new book by Tom Davenport and Larry Prusak, represents a profound shift in the way we have come to think about knowledge over the past 10 years (see the excerpt of the book on Page 58).

Ten years ago, some organizations were pinning a lot of hope on artificial intelligence (AI) and expert systems as a way to better leverage the expertise of the

people they employed. In order to work, AI required both knowledge experts (the people who knew stuff) and knowledge engineers (people who knew how to get that stuff out of the heads of the experts). That knowledge would then be encapsulated in an information system that would do our thinking for us in the eventuality of those experts dying or taking what they knew to work for themselves or the competition.

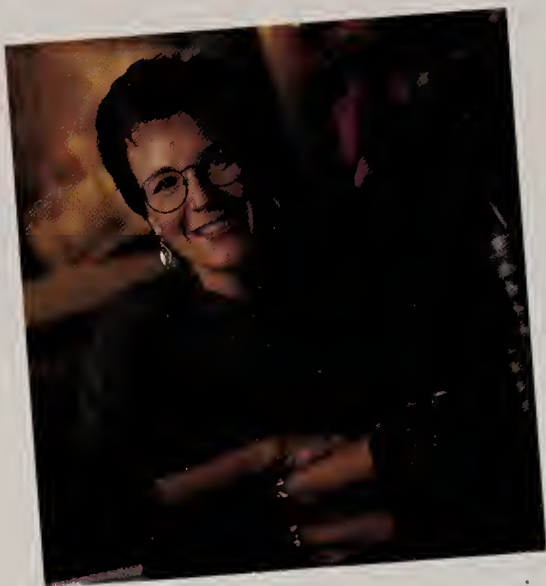
There are a lot of reasons why AI never reached wide-scale deployment—and never will. First of all, it worked from the premise that the important knowledge

was in the heads of just a few experts. This is true in only a limited number of applications. Second, the "experts" weren't stupid. They knew the value of their knowledge and weren't going to give it up lightly. Which brings us to the third problem: Getting that stuff out of people's heads is more difficult than brain surgery. Knowledge engineering as a profession never made it out of the starting gate.

Knowledge management today is a much more democratic and organic process. It assumes that the collective knowledge of the organization is worth managing (not capturing) and that most of its value comes from being widely available to many people. It's also a lot more prosaic than some of the lofty-sounding jargon that often surrounds it would lead you to believe.

Knowledge management is not brain surgery; it's more like holistic medicine. It goes against much of what we've been taught in the past, yet it's based on some fairly common sense principles. While the processes that support it are not complex in an engineering sense, they are sophisticated in terms of organizational evolution.

If you're not convinced of this—or that knowledge management is more than just another overhyped management fad—read *Working Knowledge*, which profiles the approaches and results of many companies that have become adept at increasing and leveraging the intelligence of their organizations.



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Publisher's Note

An Open Letter to Lou Gerstner

Dear Lou,

e-business is a nice marketing campaign, but IBM needs to be the unquestioned market share leader in at least one sector of the network market to make e-business a reality. My suggestion: call Eric Schmidt, chairman and CEO of Novell, and tell him IBM is interested in acquiring Novell for these reasons:

- You and your technology lieutenants are impressed with the favorable market reaction to the beta of NetWare 5 released this past fall, particularly how

Novell—like IBM—is building Java code into every nook and cranny of NetWare 5.

- Compliment Eric and Drew Major (the father of NetWare) on the technical merits of Novell's BorderManager product and its ability to help users navigate e-business Internet, intranet and extranet applications.

- Push aside past rumors of an IBM/Novell merger. Convince Eric that Java, the Internet and now the suspected delay of Windows NT 5.0 have created a new opportunity to talk. Praise Eric for the work he and his team have done on directory services and cast doubt on the Microsoft/Cisco Systems partnership's ability to build a competitive directory service for NT.

- Tell Eric you are concerned that future mind-share reports are showing a near dead heat for Lotus Notes/Domino and Microsoft Exchange. IBM *needs* to add the GroupWise installed base to its Notes/Domino share to thwart Microsoft's efforts to own a company's "digital nervous system."

- Convince Eric that putting the financial resources of IBM behind Novell, which would remain a separate subsidiary, will reenergize his ISV and channel partners. Novell once again has to become a *strategic* vendor for CIOs around the world. You can help Eric do this. Give him the telephone numbers of Tivoli President and CEO Frank Moss and Lotus President Jeff Papows and tell him to ask these guys how it feels to live under the IBM umbrella.

- Remind Eric of what the renowned IBM sales force can do for Novell sales. Point with pride to the upward of \$1.5 billion deal, the largest in IBM's history, that the IBM Software group made with EDS last December. Hammer home that this group could quickly become Novell's largest sales channel.

- Lastly, put on your Steve Jobs hat. Remember how Jobs landed John Sculley by challenging him, "Would you rather sell sugar water for the rest of your life, or would you like to change the world?" Paraphrase Jobs' quote and convince Eric that he, Novell and its emerging product line have a much better chance of changing the world of technology as a member of the IBM family than as an isolated network operating system vendor co-located in San Jose and Provo.

Lou, by the turn of the century, CIOs will have no more than two NOS vendors on their approved vendor lists. Microsoft will be one. Does IBM want to be the other? For the future success of e-business, call Eric now.

Gary J. Beach



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Trendlines

NEWS, INSIGHT, HUMOR, REVIEWS

Edited by Sara Shay



Coif Medicine

CD-ROM SALONS Bangs or no bangs? Comb-over or crew cut? Mint Sorbet lipstick or It's Your Mauve? If you're weary of facing these and other major beauty dilemmas on your own, the fashionable folks at *Cosmopolitan* are here to help. With the *Cosmopolitan* Virtual Makeover, a joint effort by The Hearst Corp.'s *Cosmopolitan* magazine and SegaSoft Networks Inc., you can experiment with different hair and makeup looks without making a commitment. The Windows 95 CD-ROM lets you apply 150 hairstyles, 20 hair colors, and a host of eyebrow shapes and makeup shades to a scanned-in photo of yourself or an image of someone even better-looking from the "library of faces."

And because fashions change faster than you can reapply your lip gloss, Virtual Makeover owners will be able to download new hairstyles, makeup shades and beauty tips every six months from the Makeover Web site. Visit it at www.virtualmakeover.com. ■

The Write Stuff

PERSONALIZED FONTS To a poor soul drowning in a swirl of e-mail, voice mail and junk mail, a handwritten letter represents an island of civility. The thought that someone bothered to pen a one-of-a-kind message is, well, downright flattering.

Unfortunately, few executives have time to forgo the convenience of onscreen editing (or the safety net of a spellchecker) to pick up a pen and write a personal note. For those who want their correspondence to command the attention of a handwritten letter but can't give up their word processors, several vendors stand ready to help. Signature Software Inc. of Hood River, Ore., offers personalized handwritten fonts in both

printed and cursive styles. A customer fills out a single-page handwriting sample form and mails it to Signature Software, whose proprietary software produces a customized font. PenFont, which sells for \$49.95, offers a single shape for each uppercase and lowercase letter to simulate printed handwriting. Personal Font, a bit pricier

at \$99.95, is an intelligent handwriting font that, when applied to text, changes the shapes of lowercase letters depending on where they appear in words.

Real estate brokers, insurance agents, fundraising professionals, direct mail agents and others interested in cultivating long-term sales relationships account for most of



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Trendlines

the 40,000-plus customers for whom Signature Software has produced personalized fonts. But while Marketing Manager Peter Plimpton won't name names, he will say that clients include some 50 cartoonists, about a half-dozen U.S. senators and members of Congress, and a former Secretary of State—not to mention several famous singers and baseball players with fan clubs.

For people who don't yet have groupies or constituents but still want to give their correspondence an air of celebrity, Killer Fonts (www.killerfonts.com) from Digital Download Inc. offers fonts that mimic the handwriting of both the famous (Ben Franklin, Abe Lincoln, Leonardo da Vinci, Edgar Allan Poe) and the infamous (Jesse James, Butch Cassidy, Lizzie Borden, Jack the Ripper and, yes, even Jeffrey Dahmer). Each font costs \$9.95, and a portion of all profits goes to charity.

Most people can tell a computerized handwriting font from the real thing, but a document printed in a personalized font instead of, say, helvetica is still more likely to catch a reader's eye, according to Plimpton. Those who use personal fonts "don't want you to believe it's handwriting; they want you to read the message," he says.

—Alice Dragoon



The Eyes Have It

ERGONOMICS What's that? You say you suffer from dry eyes? Blurred vision? Headaches? Don't blame your children just because they bang out a Sousa march on your aluminum pots whenever you step into the room. Come closer, kid, we know what ails you—computer vision syndrome!

Ergovision Inc., a company located in (of all places) Plainview, N.Y., tells us that the National Institute for Occupational Safety and Health calculates that one component of the syndrome—eye strain—mercilessly strikes 88 percent of the 66 million Americans who work on computers for at least three hours a day. It's a plague! Think not? Ergovision also reports that the American Optometric Association projects that 10 million Americans will develop eye strain each year. The condition is insidious, pitiless and pandemic.

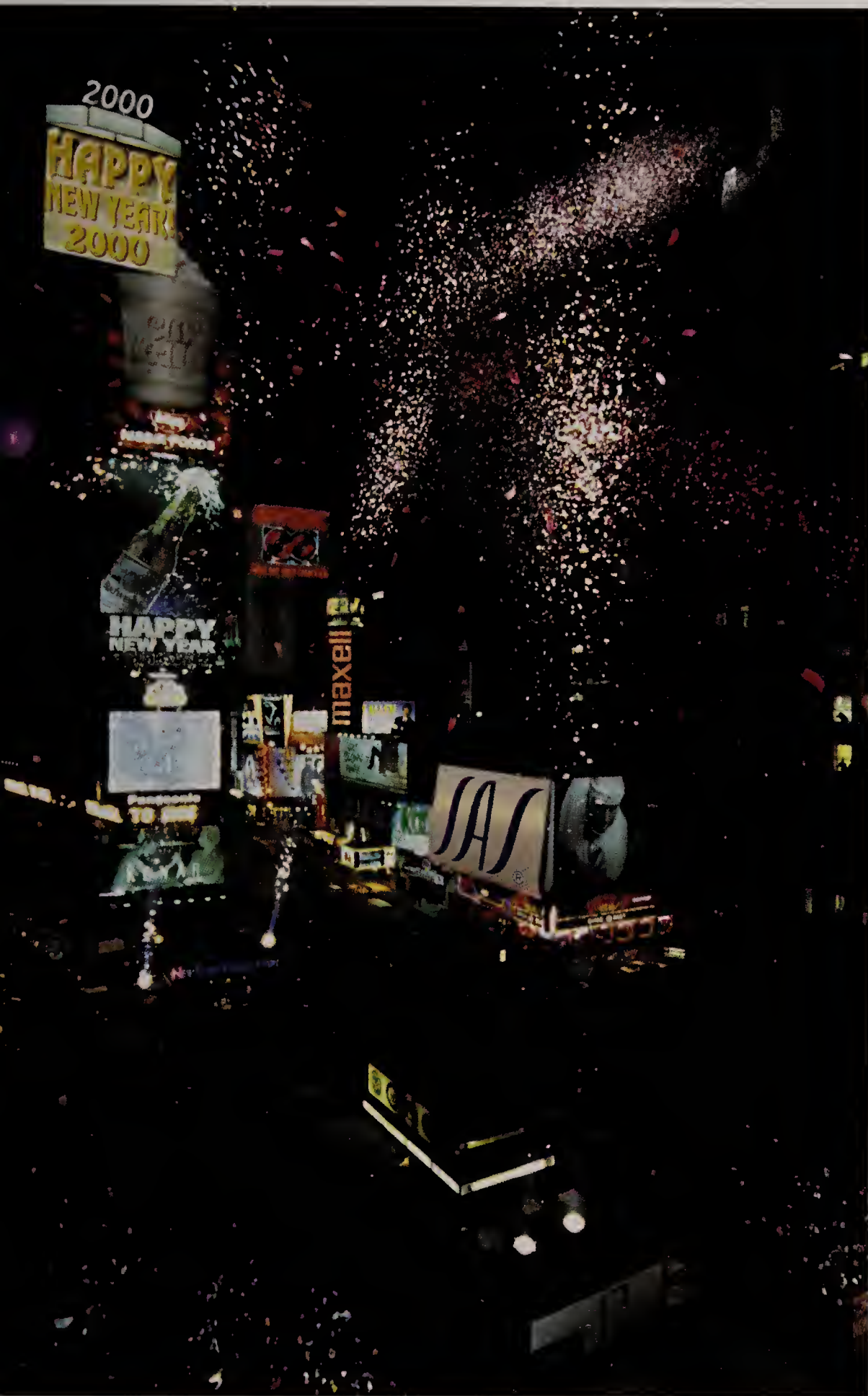
Here's the good news: Faster than Willie Nelson can be booked for the syndrome's first annual fundraiser, you can ring up the good folks of Ergovision at 888 664-5273 and get started on the cure. Their Glare-Ware eyeglasses are fitted with lenses coated with a chemical resin that intercepts glare from your computer monitor as well as from those unrelenting fluorescent lights. The spectacles come in three somewhat dowdy styles (including clip-ons for prescription glasses). But you'd better call now—at a mere \$29.95, they may all be gone in the wink of an eye. ■

Q U O T A B L E

“There's no difference between centralized and decentralized IT. There are always central organizations at the top and satellite units across the company. Only the proportion of decision making changes.”

—Jeanne Ross, Research Scientist, Center for Information Systems Research,
Sloan School of Management, MIT, speaking at SIM International's September 1997 conference

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Trendlines

Flight Attendance

AIRLINE TICKETING When it comes to fringe benefits, few companies can match the free flights major commercial airlines offer employees. Normally, all those lucky airline staffers have to do is find a seat still unsold at takeoff time. But that perk has sent many a United Airlines staffer on a guilt trip. Standby seating requires reservations agents to spend considerable time finding openings, nailing down options and predicting availability. What's worse, both parties are loath to overtax resources because the company is employee-owned.

Thanks to a few new developments, however, those off-duty employees will soon be traveling with a little less emotional baggage. United recently tested an automated, voice-recognition reservation system on 5,000 internal customers and declared it a smashing success. Here's how it works: Upon calling a toll-free number and punching in a PIN, a recorded voice asks the employee for site of departure, destination and desired flight times. After the employee responds, the voice lists available flights, the availability of standby seats on each and details such as schedule status and type of plane. Should callers change their minds, it's possible to interrupt the voice and be rerouted to the main menu.

"The idea is to free up our reservations resources for our revenue-generating customers," explains Elizabeth O'Hara, a United manager of distribution planning, based in Elk Grove Township, Ill. "It's also a way to better serve our internal [customers]."

The system, built on SpeechWorks 3.0 from Applied Language Technologies Inc., even allows for different accents and pronunciations. That's a plus for the rest of the airline's employees, internationally dispersed and 91,000 strong, who recently gained access to the system.

O'Hara says United has no plans to expand the system to paying travelers yet but hasn't ruled out the possibility. For now, the challenge is getting the employee system on automatic pilot. ■

Off the Shelf

The Price of Help

Dangerous Company: The Consulting Powerhouses and the Businesses They Save and Ruin

James O'Shea and Charles Madigan
Times Books/Random House Inc., 1997, \$27.50

HOW MUCH SUCCESS SHOULD \$75 MILLION BUY? Top management at manufacturing conglomerate Figgie International Inc. spent that much on consultants' fees, trying to turn the company into a "world-class" manufacturer. What did the company get for the money? As the authors of *Dangerous Company* put it, "Figgie [got] a world-class mess.... Eventually, Figgie International would flirt with bankruptcy, its workforce would plunge into chaos, and its balance sheet would drown in red ink."

The tale of Cleveland-based Figgie is the most lurid example of consultants run amok in *Dangerous Company*, but it certainly is not the only one. There's also the story of Bain & Co. Inc.'s relationship with Dublin-based Guinness PLC, which eventually ended when the Bain consultant turned state's evidence against his former client, some of whose employees ended up in jail. Or the one about UOP Inc. of Des Plaines, Ill., the chemical engineering company that filed a multimillion-dollar lawsuit against Andersen Consulting alleging that the consultancy failed abysmally in its promise to deliver two major computer systems.

Authors O'Shea and Madigan, both of the *Chicago Tribune*, provide a fascinating look at the practices—both good and bad—of such high-priced consultants as Bain, Andersen, McKinsey & Co. Inc. and The Boston Consulting Group Inc. We don't just hear about the failures. Many companies have used consultants successfully, such as Harley-Davidson Inc., whose decade-long relationship with Andersen has helped the motorcycle maker in its much-vaunted turnaround. Sears, Roebuck and Co., too, made limited use of consultants in its makeover in the early '90s. The succession of case studies—each chapter examines either a specific consulting firm or a business's experience with consultants—illuminates some of the ethical problems that plague consultants. How many competing companies can one consultancy serve without conflict of interest? How successfully do consultants follow through on their promises? How fair is it to populate a project with cheap but inexperienced workers, while the client company may have signed on to the project thinking they'd get the expertise of a veteran partner?

While *Dangerous Company* spends several hundred pages raising these questions, only a few pages are devoted to answering them. We'd love to hear more advice on how to make consultants work best for a specific company. Perhaps that's the fodder for the authors' next book.

—Carol Hildebrand





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Trendlines

Powerful Advice

SAP ASSISTANCE Show us a CIO implementing SAP, and we'll show you an executive who could use an on-call adviser who's been there before.

IS executives without direct access to such a fountain of wisdom can now tap into the next best thing. Price Waterhouse LLP has begun bundling a number of its SAP programs and tools under the product banner PowerCore and positioning the result as a sort of virtual competency center. The company already has a slew of similar centers in the physical world that are staffed with consultants who have SAP experience from previous projects. So it wasn't a big reach for the company to offer clients access to expert advice and knowledge bases via the Internet. Eventually, Price Waterhouse will expand PowerCore coverage to other enterprisewide global systems.

"There are two major trends driving our marketplace today," explains Chris Lilley, a New York City-based Price Waterhouse partner. "One is speed. The other is globalization. You can't meet either of those imperatives without quick access to the right information."

Price Waterhouse customizes the program for each client, but common features include electronic access to consultants, best practices learned from previous clients, and white papers and other research on the topic. For more information, visit www.pw.com/mcs. ■

The Search for Copyright Wrongs

ROYALTY WATCH Publishers have fretted about the origin and ownership of online material since the advent of the Internet. That's why the Association of American Publishers (AAP) has introduced an electronic identification system for materials on the Internet in conjunction with the Corporation for National Research Initiatives, a nonprofit organization that develops network-based information technologies.

Called a digital object identifier (DOI) system, the technology links customers with content owners, which facilitates both electronic commerce and the development of copyright management systems, according to Craig Van Dyck, chairman of the volunteer Enabling Technology Committee of the AAP, which selected CNRI to be the technology provider for the DOI system.

More than three years ago, the AAP began to sponsor a series of meetings and workshops that resulted in the definition of a need for a standard infrastructure to protect online copyrighted materials from infringements.

To the extent the copyright owner desires, the DOI system embeds alphanumeric identifiers in digital content or copyrighted material, including books, abstracts, charts and articles. When Internet users accessing the materials click on a DOI-enabled link, the system shows them a page or screen containing instructions from the information owner about obtaining permission to use the work. Eventually, the AAP hopes, the DOI system will be incorporated into copyright systems that will give publishers actual control over what users can access. In its current form, DOIs can only provide users an opportunity to do the right thing.

More than a dozen U.S. and European organizations signed on to pilot the DOI system last year. The system is now available for any content rights owner to use. It will be maintained and administered by a newly formed International DOI Foundation, which has headquarters in Geneva and Washington, D.C.

Obtaining a DOI "prefix" (the part of an identifier that denotes the content owner) costs \$1,000. For more information on the system, go to www.doi.org.

Book publishers aren't the only ones who want to keep tabs on who is using their materials. The music industry, too, is looking to protect its assets. Broadcast Music Inc., the performing rights organization better known as BMI, recently announced the creation of MusicBot, a new Web robot. MusicBot surfs the Web 24 hours a day, seven days a week, monitoring the use of music at different sites. BMI came up with the technology, a Web robot similar to those found on search engine sites, to allay the music licensing concerns of its more than 200,000 copyright holders, who want to make sure they are properly compensated when their music is used. When MusicBot happens upon an infringement, it sends that information to BMI.

BMI has also expanded its Web site, bmi.com, to better serve licensees by providing a new licensing "toolbox," which will give users easier access to items like downloadable license agreements.

—Mindy Blodgett



ILLUSTRATION BY STEPHANIE POWER

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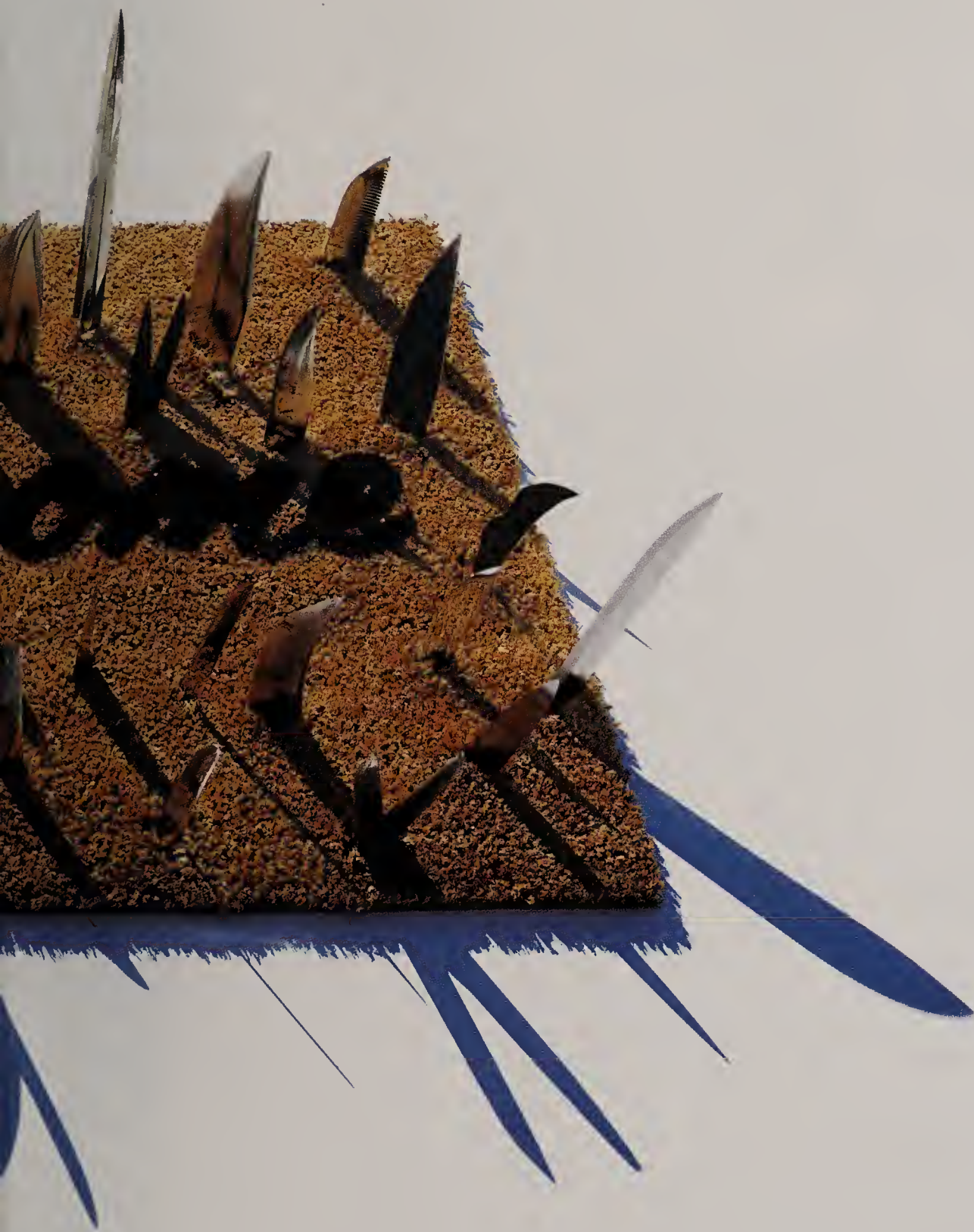
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Executive Counsel *Edited by Sara Shay*

MANAGING YOUR CAREER, STAFF AND PROFESSIONAL RELATIONSHIPS

Trying It On for Size

In the office and beyond, the size of a company affects the life of a CIO. Find out which type fits your personality.

BY DANIELLE ANDERSON

GLORIA GORDON IS IN THE matchmaking business. As a vice president in the national information technology specialty practice at A.T. Kearney Inc.'s Executive Search division in Los Angeles, she sizes up companies and searches for CIOs who fit them. The perfect match is essential to a CIO's happiness as well as a company's future, Gordon says. "There needs to be a cultural fit with other executives," she says. "If there is not, the executives are never going to be happy with what IT delivers."

Finding a comfortable fit largely depends on an individual's personality and on what excites him or her about working, Gordon says. Because the size of an organization can dictate the nature of a CIO's job, IT executives considering a move must think about how different company sizes might affect them. Thomas Parkinson, for example, the co-founder of an innovative shopping service, thrives on the gut-wrenching thrill of realizing a dream on a shoestring budget. CIO Gary Baxter, on the other hand, enjoys the spectacular view from his

office at Maine Employers' Mutual Insurance Co. and the opportunity to have a measurable impact on a small company without sacrificing time with his family. And Jerry McElhatton, executive vice president and president of global technology and operations for MasterCard International Inc., welcomes the challenges of managing major projects and motivating a staff of 1,500 to think creatively.

Starting Small

In the last couple of years, Parkinson has scaled back his workweek. Now the co-founder of Peapod Inc. is in the office only six days instead of seven. "I have about 45 people in my IT department, and every one of them does something I personally used to do," says Parkinson, executive vice president and chief technology officer of the Skokie, Ill.-based interactive, online grocery shopping and delivery service.

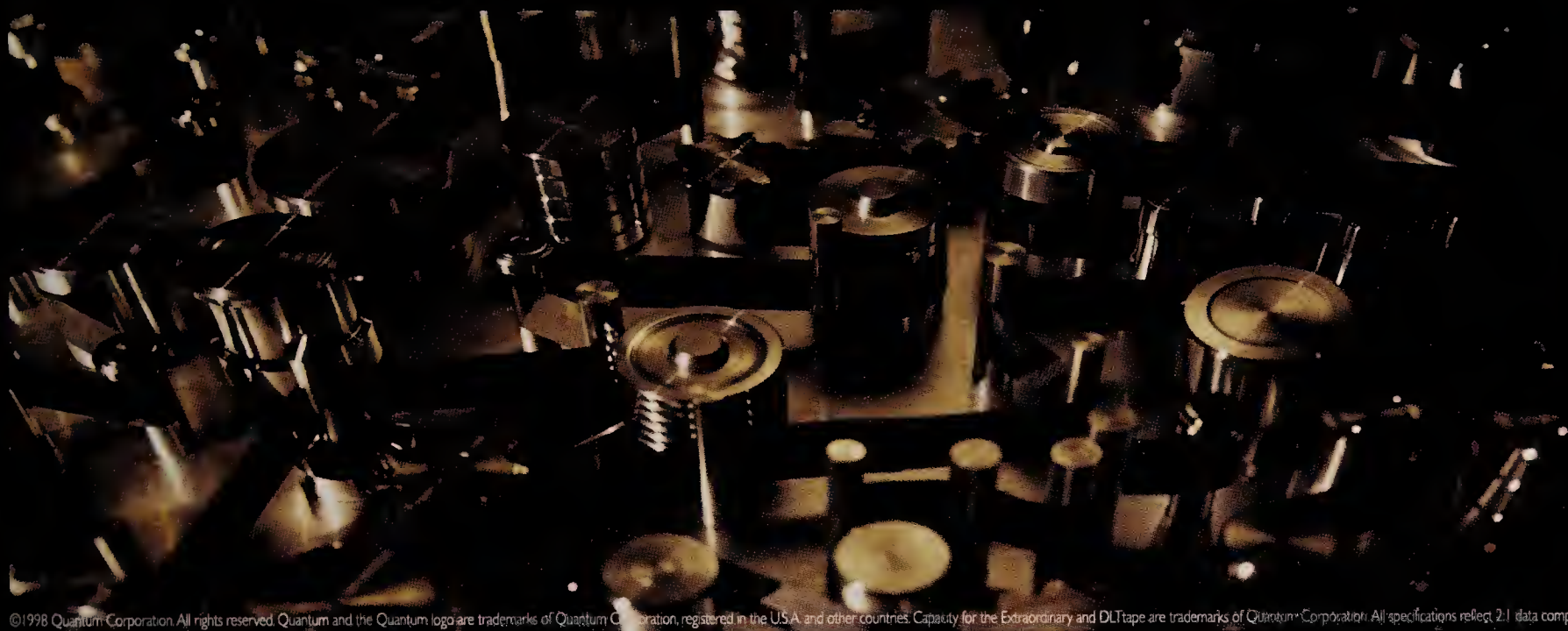
Parkinson and his brother, Andrew, launched Peapod in 1989. Fresh from a year-long trip around the world, Parkinson immersed himself in expanding the company. For the first two years of the company's existence, his life consisted of shopping and delivering groceries by day and writing code for accounting software by night. In addition, he and his brother were doing the roadshow routine to raise money while learning accounting and other basic business skills.

As a result, they learned to be creative with limited cash. "The hardest thing about the early days was running on fumes," Parkinson says. "We were able to make payroll only because we had not paid for the groceries we had purchased and resold. So we basically made payroll on payables. Talk about stress."

The dream of being among the first leaders of e-commerce kept Parkinson going during



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those early years of long days and short funds. "As Peapod started getting bigger and bigger, the dream just got more and more real," Parkinson says. "But the pressure gets to be more and more, too."

Today, Parkinson's job is less hands-on than it used to be but no less fragmented. He's in charge of Peapod's overall technology and software development and maintenance, and he also helps develop company strategy. On an average day, Parkinson rides a roller coaster of responsibility that takes him from basic programming to high-level budget meetings to retail store presentations to interviews with reporters. The ride doesn't slow down until bedtime, when he relaxes with trade magazines. But even then it is hard to let go. "What happens if something fails when you go to

now Parkinson seems to enjoy his role as chief motivator. "It's really great to be a leader, to lead a group of people like you are taking them into battle," he says.

In the Middle

Gary Baxter has a unique view from his sixth-floor corner office in Portland, Maine. He can look back over the past 18 months and see the difference he's made as CIO at Maine Employers' Mutual. He can look forward and see ways to improve the company, which specializes in worker's compensation insurance. And he can look out his window and see Casco Bay.

Baxter didn't always see himself as the company's CIO, however. In fact, he almost turned down the position at the 165-person company when it was offered

individuals at all levels of the company. The result was a total turnaround in company culture. "I have wonderful relationships with my peer vice presidents. My staff is very happy and good at what it does. [The IS department]

"I can affect the way the company operates directly just based on who I am and what I know."

*—Gary Baxter, CIO,
Maine Employers' Mutual Insurance Co.*

sleep tonight?" he asks. "If [our systems] go down, we lose a million dollars' worth of business."

Parkinson can't quite explain how he keeps it all together. "It's really hard," he says. "That is what a startup is all about, and not everyone can stomach it."

A self-proclaimed workaholic, Parkinson says building Peapod gives him greater responsibility for his own future. "My friends who are lawyers and doctors are making good money," Parkinson says. "If I wanted [to make money faster], I would have gone down that route. But I didn't want to work as hard as I do for someone else."

Money is still extremely tight at Peapod. All the office furniture is secondhand, and company executives who have defected from slick corporations have learned to function without company cars, cell phones or secretaries. And Parkinson must motivate and retain a staff working below market rates. He frequently walks the floor to cultivate an atmosphere that is both caring and fun.

Someday he hopes to cash in on the consumer-direct phenomenon, but for

to him. His predecessors had botched an underwriting system project and senior managers were angry. "I had an interview with all the vice presidents, and they were tough," says Baxter, who had been working as a client/server developer. "I was really hesitant to take the job."

But despite his initial reservations, Baxter decided to jump in, and along with the ocean view, he inherited a sinking ship. "The culture had been a very overworked IS staff and very unhappy internal customer users to the point where one vice president said the company was going outside for IS services," he says.

Baxter worked quickly to repair the situation. He hired additional staff and assimilated them into the day-to-day tasks. At the same time, he launched a PR campaign to improve the reputation of IS within the company. "It was essential to clearly communicate to the people who were working with me, to my boss and to my peers in the organization that things were different," he says. An important part of that initiative was the decision to publish department accomplishments. He also began to build personal relationships with

Know Thyself

All companies have their own cultures, independent of size. But some general personality traits will serve CIOs better at one type of company than another, according to Gloria Gordon, a vice president in the national information technology specialty practice at A.T. Kearney Inc.

STARTUP

- Jack-of-all-trades
- Resourceful
- Innovative
- Action-oriented
- Self-motivated

SMALL TO MIDSIZE

- Creative
- Good communicator
- Cost-conscious
- Able to use best practices and shamelessly steal ideas

GLOBAL

- Comfortable with large-company vision
- Understand channels within the organization
- Good salesperson
- Able to work the politics
- Able to delegate
- Able to pick exceptional managers

restored trust and confidence in our ability to deliver what the customer needs."

The successful overhaul has earned Baxter a great deal of autonomy. "The CEO relies on me personally for technology direction decisions," Baxter says. "He'll come into my office and say, 'What's up with this? I saw it in an airline magazine.'"

"I can affect the way the company



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Executive Counsel

operates directly just based on who I am and what I know," he adds. "That's good for me, but it also implies that I have to be right."

Maine Employers' Mutual has no IT steering committee; memo writing and policy development have little value for Baxter and his peers. Communication is factual, goal-oriented and results-driven, Baxter says. That approach gives Baxter and his staff the freedom to execute solutions that might get held up in

a point when I say, 'OK, this has been great, but I could make another 50 grand just by driving 30 miles.'"

Going Global

Jerry McElhatton is responsible for maintaining a system that facilitates more than 6 billion transactions a year. The head of MasterCard International's operations and technology worldwide, he works 12- to 14-hour days and spends 75 percent of his time traveling.

Jerry McElhatton works 14-hour days and spends

75 percent of his time traveling. But he's the type of guy who finds the challenge of managing major projects relaxing.

committee at a large organization. For example, they recently outsourced a project to programmers in India when enlisting state-side vendors turned out to be prohibitively expensive. "It was very successful from a functionality point of view, and from the financial point of view, it was a no-brainer," Baxter says.

By necessity, Baxter's freedom demands a high level of informed responsibility. To stay on top of trends, he devotes about 25 percent of his time in the office to reading and staying current. Part of his commitment to constant learning is necessitated by his location. "Portland, Maine, is not exactly a hotbed of technology, so there are not a lot of peers to share information with in a noncompetitive way," he says.

Right now, Baxter derives a lot of benefits from working for a company the size of Maine Employers' Mutual. He works eight-hour days and travels infrequently. "Part of the attraction of this job is my ability to get home and spend some time with my wife and two kids," he says. "I occasionally will take the laptop home and do what I have to do, but for the most part, we don't value that type of effort here."

A year and a half into the job, Baxter says he gets calls from headhunters once a month. If he does leave, Baxter says, money will be the reason. "I make a good salary, but I could make a lot more," he says. "Eventually, I will be at

But he's the type of guy who finds the challenge of managing major projects relaxing. "You couldn't have a job like this and not enjoy it," he says. "It's just too big. It's just too dynamic."

McElhatton manages a never-ending race to upgrade and refresh existing systems, while developing new products and services to entice users. "The major challenge that we face is to deliver. A lot of that hinges on technology," he says. "Can we do something different from the major competitor? Can we do it quicker?"

For McElhatton, that race reduces to the basics of project management. "An average day [sees] a tremendous amount of managing of resources," he says. "[Reviewing] status reports, making sure we are on schedule and on budget, and that we have all the major deliverables."

Currently, those projects include overseeing the construction of a virtual private network, which over the course of the year promises to save customers a significant amount of transaction-processing time. This network, which will also improve transaction security and reduce costs, cuts 400 milliseconds from each transaction. Multiply that savings times the 6 billion transactions

MasterCard expects to handle this year and it really adds up.

Although this installation is a major project for MasterCard, it is not a daily concern for McElhatton, who receives monthly updates from the senior vice president of operation services. "My hands are very much in it because I'm the guy chartered to make it successful," he says of the project, now in its fourth year. "I have an [employee] who heads up our data center and network, and he is totally responsible for what the people who work for him do."

In addition to handling significant project management responsibilities, McElhatton is in charge of 1,500 employees at MasterCard's Global Operations Center in St. Louis. Because change can be intimidating, he says motivating those employees to work creatively is a constant challenge. He understands why. "[Say] I drive to work the same way every day and all of a sudden traffic is bad, and I have to switch to go somewhere else," he says. "It takes time to adjust."

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2. Why did you make previous career changes?
3. What motivates you in your current job?
4. Why did you decide to take your current job?
5. Why do you want to leave your job?
6. Do you want to travel?
7. What kinds of work situations get you excited?

SOURCE: GLORIA GORDON, A.T. KEARNEY INC.

such as virtual private networks, may eventually become jammed. To avoid future roadblocks, McElhatton encourages his staff to constantly search for new ways to work. The goal is contented customers, he says. "We always try to be superior in the service we provide because we don't want our card to go to the back of the wallet." **CIO**

Danielle Anderson is a freelance writer based in Oak Park, Ill.



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Price of Precision

Charging back exact costs to internal customers within an organization may seem a best budgeting practice for IS, but a "rough justice" estimate might be the better way to count beans

BY THOMAS D. OLESON

IF I.S. IS EVER TO GET THE RESPECT it deserves, it must first be understood. Internal customers who demand superb service with no knowledge of what top-grade service costs must be educated. Assuming that paying for internal IS is the better deal, an IS department can alert its internal customers to the tremendous value they are receiving by presenting them with a detailed bill for services rendered.

Such chargeback systems help control an enterprise's costs by having customers who initiate IS expenses pay for them out of their own budgets. But a rigorous chargeback methodology—one that will earn respect—requires IS management to develop, administer and maintain what can become a Byzantine method of data collection. Worse, a rigorous cost accounting system is often prohibitively expensive. Worst of all, the data needed to make such a system work, particularly in the client/server environment, is almost impossible to gather because of the degree of detail needed to make a cost accounting system accurate.

Traditional cost accounting requires strict rules and controls around each expense category. The alternative, rough justice, uses estimating and ratio development, an accounting practice that divides the total

number of dollars spent by the total number of service usages. Such a metric is simple but clearly inexact; only rough justice is possible with so gross a yardstick.

Then and Now

In an effort to supply the IT community with the information necessary to make intelligent choices about accounting procedures, IDC first addressed the issue in a 1994 survey. Four years ago, the embryonic client/server architecture was exempt from chargeback practice in most companies. Those companies that did charge back their services used flat rates tied to network

connectivity, server access and other features. Typically, in 1994, IS departments had varying fee structures for different services (see "Chargeback Candidates," this page).

In fall 1997, IDC again surveyed top information executives from 75 large financial sector corporations on this subject. We asked them two questions:

■ Is a rigorous cost accounting system that transfers IS expenses back to internal customers warranted, or does the rough justice method accomplish the same thing at less cost?

■ How does your company address expenses associated with the new client/server, network-centric computer architectures?

We learned that not much had changed in the methods of client/server chargeback. Not surprisingly, the help desk and business function software packages now on so many distributed systems are new categories of services for chargeback.

What IS Shops Are Doing

When it came to choosing an accounting methodology, 40 of the respondents follow a rigorous cost accounting approach; 35 pursue a rough justice approach.

Those who use cost accounting

Chargeback Candidates

Fees for IS services are calculated on various schedules

Services	Fee Schedule
E-Mail	Cost per mailbox
WAN Connectivity	Cost per month per workstation
LAN Connection	Cost per connection to Ethernet, Token Ring LAN
LAN Servers	Cost per sign-on access to server
PC Usage	Cost per month or year, based on class of processor
Office Products	Cost per corporate standard packages or cost per year per PC

SOURCE: INTERNATIONAL DATA CORP.



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IDC View

most often said they do so to make certain that chargeback rates are accurate and equitable. Accounting motivations, such as allocating costs to the ultimate end user and influencing customer behavior by raising customer awareness so that they can take greater responsibility, were the second most frequently mentioned motives for choosing rigorous cost accounting.

Those IS shops following the rough justice approach offered three reasons for their choice. Most often, they were unwilling to dedicate the necessary resources and money needed for a full cost accounting system. This group also noted the lack of measurement tools leading to a dearth of information needed to create a sound cost accounting system. The difficulty of accomplishing a rigorous chargeback system compared with the ease of a rough justice system was also frequently cited.

IDC found that many executives such as treasurers, chief purchasing agents and vice presidents report they are too busy to learn the arcane technology terms required for comprehensive IS cost accounting. In fact, only 74.2 percent of the cost accounting group reported understanding the categories of service on their chargeback systems, while 65.6 percent of the rough justice group said they understand them. (See "Rigorous Cost Accounting Versus

Rough Justice," this page.) There's a big price tag attached to that less than 10 percent difference in understanding. And when executives who did rigorous cost accounting were asked about the effect of unintended consequences on their system's results, 31 percent reported that unintended consequences skewed their results. A typical unintended cost

such as "CPU seconds" and "start I/Os," are being changed to more meaningful terms such as "cost per transaction." Despite the new terminology, IS still has a way to go in refining the system to meet the business needs of the organization at a level of detail that will satisfy every customer.

Finally, for such chargeback categories

Companies without a direct charge for CPU, data storage and communications services do not have strict cost accounting systems but merely believe they do.

might be to have an internal customer who felt disadvantaged by other departments opting out of a shared application, thus leaving colleagues a heavier burden of fixed costs. If nearly one-third of respondents believe unintended consequences skew their cost accounting system, it's hard not to ask, Is such a complex system a good investment?

Data Centers and Client/Server

IDC is seeing some changes in both the data center and distributed computing environment chargebacks. Client/server chargeback is no longer a skunkworks operation with expenses folded into mainframe expenses nor buried within data center chargeback costs. Data center charges, once couched in techie terms

as CPU, data storage and communications, our survey found that these and many other IT services often are not, in fact, receiving strict cost accounting treatment. The inescapable conclusion is that companies without a direct charge for these services do not have strict cost accounting systems but merely believe they do. They pay a high overhead for a system whose completeness is an illusion.

Best Practices

Companies that think they have a strict cost accounting system should realize that a change may be in order. IS executives should take a long, hard look at the methods of collecting data that establish charges, the cost of administering their data collection systems, and the perceived and actual benefits to customers. IDC is betting that rough justice—presenting internal customers with fair billing for far less money and with less anguish—will win hands down as a more useful and less expensive methodology.

The value of an IS group's services can best be conveyed through a chargeback system that relates its activities with the company's business functions in a meaningful and cost-effective way. The challenge for the CIO is to address these issues with the company's financial department and IS customers and to convince them that not every bean in the pile was meant to be counted. Sometimes it's enough to give an estimate of the pile's size. **CIO**

Thomas D. Oleson, research director at International Data Corp. in Framingham, Mass., can be reached at toleson@idcresearch.com.

Rigorous Cost Accounting Versus Rough Justice

Seventy-five IT executives are closely divided when evaluating two accounting methods...

...because those methods yield approximately the same results.

IS can determine value from chargeback

Chargeback system accurately reflects customer usage of IT

Accounting system creates unintended consequences that skew results

Rigorous Cost Accounting Adherents

40

Respondents who agree

57.9%

69.2%

30.8%

"Rough Justice" Accounting Adherents

35

54.3%

58.8%

41.2%

SOURCE: INTERNATIONAL DATA CORP.

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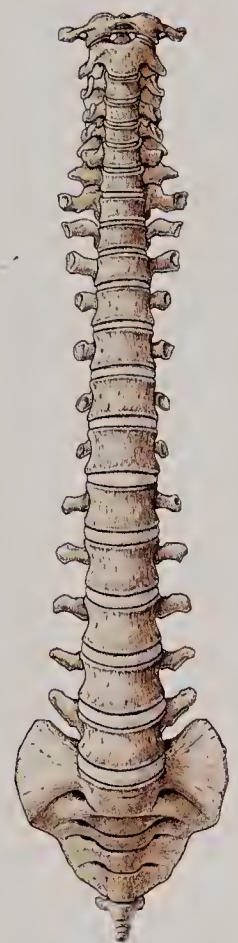
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Reader ROI

SOME COMPANIES, MANY OF THEM network service providers or telcos, view ATM as the definitive network protocol of the future, but the average corporation is still in the early stages of evaluation. This article describes

- What ATM offers network managers
- How ATM has become more flexible and appealing
- Where ATM makes sense in a corporate network

HealthSystem Minnesota used ATM to centralize multiple servers, says Network Manager Keith Hurlburt.

ARE YOU READY FOR ATM

Asynchronous transfer mode can speed up multimedia applications, but not every company should rush to adopt it—yet

BY TRACY MAYOR

Quick, what's a three-word status report on asynchronous transfer mode? If you said, "Hot! Hot! Hot!" chances are you work for a switch maker, a telecom carrier, an Internet service provider or some other technology-forward corporation. Companies with an immediate need to transmit high-speed, high-bandwidth data, voice and video in real-time over telephone lines consider ATM to be here-and-now technology.

If the three words you picked were "probably next year" or "we're keeping tabs," you're most likely in company with the vast middle ground of mainstream IT executives who are tracking the technology closely but aren't ready to switch from Ethernet (ATM's main competition at the desktop), frame relay (its closest rival in enterprise networks) or any one of several predominant transmission protocols currently in use in wide area networks.

PHOTO BY STEVE WOIT

"We're seeing broad evaluation [of ATM] at this point, people asking where and how and when," says Jeff Kaplan, director of strategic marketing in the Boston regional office of International Network Services, a Sunnyvale, Calif.-based network services integrator. "But the reality is analysts and the press are still a generation ahead of where customers are. Most are still adopting frame relay and just now getting comfortable with ATM."

The main attraction of the asynchronous transfer mode protocol is its support for voice, data and video. On paper at least, this capability enables end-to-end networks to handle an organization's information traffic from the desktop all the way to the wide area, although such configurations are rare at this point. The protocol offers built-in quality of service, a feature that lets network managers tailor bit rates to guarantee the smooth transmission of voice and video. And ATM is scalable, capable of handling speeds between 1.54Mbps and 2.4Gbps. Now with lingering specification questions cleared up, a handful of technological breakthroughs making the protocol more marketable and data traffic ever increasing, ATM's time may finally be approaching.

The protocol is being tested in Fortune 1000

companies, though very few are ready to talk publicly about preliminary results or the possibility of large-scale implementation. Companies in that vanguard have turned to ATM to deliver speed-hungry, bandwidth-gobbling multimedia applications such as telemedicine, videoconferencing, online banking and other electronic commerce functions, real-time CAD/CAM and embedded video. And supporters insist it's only a matter of time before ATM crosses the divide to become common in everyday network configurations.

Of course, industry watchers have made similar projections about other supposed up-and-coming technologies before—think ISDN, whose moment passed before it ever really arrived. But ATM is different. "With ISDN, the debate was always whether it was going to be a useful technology," says Kaplan. "With ATM, people know it's going to be useful. It's just a question of when."

The answer? Maybe in the next 12 to 18 months. The total market for wide area networking asynchronous transfer mode equipment is expected to grow from \$987 million in 1996 to \$5.98 billion by the year 2001, a compound annual growth rate of a healthy 37.9 percent, according to market research company Dataquest Inc. By contrast, the frame relay equipment market, which was worth \$1.6 billion in 1996, will be worth \$3.4 billion in 2001, a compound annual growth rate of 10.3 percent, says George Hunt, director and principal WAN analyst for the San Jose, Calif., company.

Companies that market ATM, including switch makers such as Northern Telecom Ltd. (Nortel), Newbridge Networks Corp. and Cisco Systems Inc., are already experiencing that growth in ATM products and services firsthand. Cisco, for example, had 40 percent growth in its most recent quarter, with 100 percent growth each year since late 1995, according to Jayshree Ullal, the company's vice president for the enterprise line of business.

Benefits that Meet Market Demand

A lot has changed since two years ago, when ATM was considered bleeding-edge technology and early adopters had to contend with unsettled standards and proprietary equipment (see "The Switch Is On," CIO, Oct. 1, 1995). The ATM Forum, a global research consortium based in Mountain View, Calif., has in the past 24 months approved and promoted some 62 specifications designed to provide details on the ATM protocol, and hardware and ATM service providers have responded with better and more standardized products. "The interdependencies are all aligned and coordinated now," explains George Dobrowski, president of the ATM Forum and director of broadband switching and signaling technology at Bell Communications Research Inc. (Bellcore) in Red Bank, N.J. "The foundation specifications are now stable, and new

ATM proponent Rob McCormick, executive VP and CTO of Bridge Information Systems: "We can deliver now in 20 milliseconds, where it used to be 90 milliseconds."



Down to the Desktop

Will the magic of ATM transform your personal computer?

One of the biggest promises of the asynchronous transfer mode (ATM) protocol is its ability to provide a single conduit for data, voice and video from the individual PC on out to the wide area. But thus far, the promise of ATM has ended a bit short of the desktop.

Many corporate end users simply don't need ATM's high-bandwidth, high-speed multimedia capabilities on their workaday PCs, and deploying the ATM equipment, which is newer and more costly than hardware for established protocols, doesn't make economic sense for many organizations at this point.

But the primary factor halting ATM's march to the desktop is inertia, also known in networking circles as Ethernet. The venerable LAN protocol works, and works well, for countless thousands of users, and network managers struggling with long-term, strategic enterprise and wide area decisions are only too happy to leave alone what ain't broke. "People are very comfortable with the price and performance of Ethernet, and there are multibillions of Ethernet ports out there already," points out Jayshree Ullal, vice president for the enterprise line of business at Cisco Systems Inc. At the desktop, at least, "ATM will have to peacefully coexist with Ethernet," she says.

Compounding ATM's problems in getting to the desktop, companies that have outgrown Ethernet have other, less costly options when their main concerns are speed for data-

only transmissions rather than support for voice and video. Fast Ethernet, running at 100Mbps, or the newest standard, Gigabit Ethernet, supporting speeds as high as 1Gbps, are often the upgrades of choice when Ethernet LANs run out of steam.

Raw speed led MindSpring Enterprises Inc. down the path to Gigabit Ethernet. The Atlanta-based Internet service provider, which services some 240,000 Internet users, maintains one Fast

Ethernet LAN and another LAN for file serving that's a hybrid. Originally installed in early 1997 as a Fast Ethernet LAN, it was upgraded to Gigabit Ethernet shortly afterward.

"We looked at FDDI, at ATM and at Gigabit," says Systems Administrator Johannes Erdfelt. "Gigabit Ethernet is just the fastest LAN technology out there right now."

For all its speed, Gigabit Ethernet neither handles such simple data as voice and video traffic nor offers built-in quality of service, making the desktop decision even more complicated for companies that need

to transmit complex information.

"Gigabit may be the future of data, but we were trying to put in a network that would move information—video and voice traffic," says Brad Hartig, enterprise manager for the city of Scottsdale, Ariz., which maintains two ATM backbone networks. "If we were going to be very shortsighted, we could have used FDDI or Gigabit Ethernet, but it would have only been a stopgap solution."

—T. Mayor



MindSpring Enterprises' Johannes Erdfelt

specs have to be backward-compatible and interoperable so that [customers] won't be caught out."

ATM's most prominent attributes—its speed, multimedia support and quality of service—dovetail nicely with corporate demand for flexible bandwidth. "We've seen high increases in enterprise volume levels," says Jay Pultz, a research director specializing in broadband networking at Gartner Group Inc. in Stamford, Conn. Network traffic is increasing by 25 percent to 50 percent annually, he says. "You don't need very much compounding to get to very high bandwidth levels, and ATM is one technology that allows you to scale up."

The city government of Scottsdale, Ariz., is one place where demand is high and ATM is already delivering on its promises. Rather than maintain about 16 separate local area networks on two physical campuses, the city installed two large ATM backbones in 1996 as part of a \$2 million infrastructure improvement plan. Most LANs still run

Ethernet, although some larger buildings have workgroup-level ATM, according to Brad Hartig, enterprise manager for the city of Scottsdale.

The city previously had no backbone, so jumping straight into ATM was a bold move, and particularly bold for a municipal government, Hartig says. "It's forward thinking, and we're so glad we did it," he says. "We saw the convergence of voice, video, data and imaging. We wanted something scalable, so we can have 1.54Mbps today and 622Mbps tomorrow or even bump it up from there. And we needed quality of service."

Is all that transmission prowess needed to process voter-registration records and other quotidian civic services? Not quite. Scottsdale is known nationally for its equally bold and forward-thinking geographic information system (GIS), which delivers maps with six-inch accuracy to as many as 300 city workers underneath a variety of applications. A single digital-flyover map can be as large

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Buyer-Friendly Options

Organizations whose data needs haven't quite reached the level of 10MB per click can take advantage of some specific technological developments that now make it possible to roll out ATM piecemeal rather than adopt it end-to-end. The options make ATM more appealing to corpora-

"A corporate backbone is a five- or 10-year decision. You don't upgrade your servers and routers every 10 or 15 months."

—George Dobrowski

tions that need it only in certain areas or at certain levels of the network. That's a marked change from the past, when companies felt forced to jettison existing technologies in order to deploy ATM. "Migration and introduction of the technology was definitely missing," says the ATM Forum's Dobrowski. He can tick off an alphabet soup of developments that make the protocol more flexible and modular. "LAN emulation, VTOA, MPOA, circuit emulation over ATM and inverse multiplexing all show we want it to work over any physical interface you can conceive of," he says (to make sense of all the acronyms, see "Defining Moment," Page 47).

Multiprotocol over ATM (MPOA) is a new standard that allows legacy protocols, such as fiber distributed data interface (FDDI), frame relay, Internet packet exchange (IPX), NetBIOS, Appletalk and Internet protocol (IP), to take full advantage of ATM's speed and quality of service. The development allows companies to apply network protocols strategically and avoid having to make costly and possibly restrictive all-or-nothing decisions.

For example, the ability to route frame relay traffic over ATM is a key attraction for customers building new networks, says Joe Lueckenhoff, product vice president for data network services at AT&T Corp.'s Business Markets Division in Bedminster, N.J. "In certain situations, ATM is the right solution. In other situations, frame is the right solution," he says. "[Moderate-use] customers in locations one through 10 might have frame, for example, then data centers or large engineering centers would use ATM."

Another relatively new development is inverse multiplexing, a standard that allows companies to

buy or deploy ATM services in multiple T1 increments as a cost-saving alternative to expensive T3 lines. The option gives managers more control over bandwidth allocation and makes it more practical to use ATM as a backbone and as a spur out to branch offices. "I call it the Goldilocks theory of ATM," says Gartner's Pultz. "T3 is too much, T1 is too little, but inverse is just right."

Finally, the development of the standard for voice and telephony over ATM, or VTOA, more specifically defines just how voice traffic should be handled over ATM. While the voice-data-video combination was at the foundation of ATM from the start, data was the chief preoccupation for the first several years of the protocol's existence simply because demand was highest for a high-speed data delivery technology. Now, with voice standards solidified and a significant number of VTOA-conformant products expected early this year, companies can begin to take seriously the option of "collapsing" their networks—that is, transmitting data as well as quality voice and video over one economical, easily managed network.

Vendors, analysts and other industry watchers say the move toward collapsing the network will become ever more popular in the next several years because of ATM. Right now, "Data uses frame relay, and voice is over VPNs, but there's an irreversible trend toward bringing that traffic onto one network," says Tony Rybczynski, director of strategic marketing and technologies at Nortel Enterprise Networks in Ottawa. As Nortel makes the case to its customers, corporations' expenses for voice communications often still represent 50 percent of their communications budgets, even though voice traffic is relatively flat and data traffic volume continues to skyrocket.

By running voice over a data network, organizations can save money on voice and apply it to more pressing data needs, says Rybczynski. "They're looking at moving voice over some sort of packet-switched technology, and with voice over ATM there are no quality issues because it's built into the spec." MCI Communications Corp. is currently the only telco to support such multiplexing, but the other major service providers are expected to follow suit early this year.

In fact, telecommunications carriers themselves were the earliest adopters of ATM and are now marketing ATM services to their corporate customers. AT&T's Lueckenhoff, for example, says the company foresees triple-digit growth in its ATM business over the next several years. And where the carriers go, analysts reason, large corporations are sure to follow.

"There has been a lot of debate about whether IP will be the wide area protocol of choice, and

debate is important," says Dataquest's Hunt. "But carriers have committed to ATM in their backbones and will install an ATM infrastructure to support all their other services. And that will bring along corporate." Indeed, such progressive companies as USAA, American Airlines Inc., Kaiser Permanente, Bear Stearns & Co. Inc. and McDonald's Corp. are all applying ATM at least somewhere in their networks, though at this point few corporations are ready to sing its praises in public.

Where ATM Makes Sense

Does all this high-profile support from carriers and technology leaders mean you should rip out your brand-new frame relay backbone, trash your much-beloved Ethernet and install ATM from soup to nuts? Thankfully, no. "People [have] realized there is a right place for ATM and a right place for Ethernet," says Cisco's Ullal. "There is a natural home for all of these technologies."

ATM can be at home in three places in the corporation: the wide area, enterprise and local area network. So far, it has had the greatest success in the wide area, with midrange backbone deployment still hotly contested and the desktop up in the air for at least a few years to come (see "Down to the Desktop," Page 43).

Because it requires completely new hardware and software, ATM is more expensive than protocols that work with existing or upgraded equipment. For most companies, therefore, it makes economic sense to apply ATM where they can reap the fullest return on its high-speed, high-bandwidth multiprotocol capabilities—that is, in the wide area, where network traffic is most intense.

With its emphasis on cell technology, ATM's roots are in the wide area to begin with, and the case for wide area deployment is strengthened by long-distance carriers' support for the technology. The market for carrier-based ATM was insignificant a few years ago and has grown to \$150 million today, according to Gartner's Pultz.

At the enterprise level, the decision to use ATM is less clear-

cut. Many companies are still using Ethernet or just now deploying frame relay in backbone and campuswide networks and are happy with its results. But traffic demands—both in volume and in the types of information being carried—could turn that situation around in the next few years as companies reach their limits with Ethernet and potentially hopscotch over frame to ATM. "A corporate backbone is a five- or 10-year decision. You don't upgrade your servers and routers every 10 or 15 months," says Dobrowski.

At HealthSystem Minnesota, a Minneapolis-based integrated care system with some 30 remote locations statewide, ATM in the wide area coexists with Ethernet local area networks and most likely

Defining Moment

Consult this list to get your ATM vocabulary up to speed

ATM: A virtual-circuit, cell-switching protocol for both LANs and WANs that typically operates at a speed of 44.7Mbps, although speeds can range between 1.54Mbps and 2.4Gbps. Speed as high as 10Gbps is predicted for the end of 1998. ATM supports real-time transmission of voice, video and data.

Frame Relay: A high-speed, scalable packet-switching WAN protocol that supports transmission of both data and images at 1.54Mbps.

Gigabit Ethernet: A very high-speed adaptation of the ubiquitous Ethernet LAN standard that supports data transmission speeds up to 1Gbps.

Inverse Multiplexing: A method that allows ATM to run at T1 speeds, which are more common and less costly than ATM's standard T3 rates.

MPOA: Multiprotocol over ATM. Allows organizations to run multiple network layer protocols, primarily legacy protocols, over ATM while preserving ATM's quality of service.

Quality of Service: Allows network managers to tailor attributes of the ATM for voice, video or data to guarantee quality transmission.

VTOA: Voice and telephony over ATM. Specifications that define how voice should be carried over ATM networks at LAN, WAN and mobile service levels.

For more information about various transmission protocols, check out the ATM Forum (www.atmforum.com), the Gigabit Ethernet Alliance (www.gigabit-ethernet.org) or the Frame Relay Forum (www.frforum.com).

Sources: Newton's Telecom Dictionary (Flatiron Publishing Inc., 1997), The Computer Desktop Encyclopedia (AMACOM/American Management Association, 1996), FOLDOC (Free On-line Dictionary of Computing, wagner.princeton.edu/foldoc), ATM Forum and Gigabit Ethernet Alliance.

will for some time to come. The company's WAN, built around Magellan Passport switches from Nortel, carries both voice and data traffic, according to Keith Hurlburt, network manager in the company's information management department. "We had 32 different types of PBXs and key systems, plus four to seven data communications net-

sions, some companies are considering the use of Gigabit Ethernet technology, which is already generating interest at the LAN level. But for larger installations, the protocol doesn't have the physical reach of ATM nor its quality of service, detractors point out.

"Gigabit Ethernet is fine for hooking up lots and lots of user workstations, but it has distance limitations, and unless you have really big [data] packets, you don't get gigabit throughput," says Rob McCormick, executive vice president and chief technology officer at Bridge Information Systems Inc., a St. Louis financial information company that delivers real-time investment data to clients such as Merrill Lynch & Co. Inc., The Goldman Sachs Group LP and Shearson Lehman Brothers Inc.

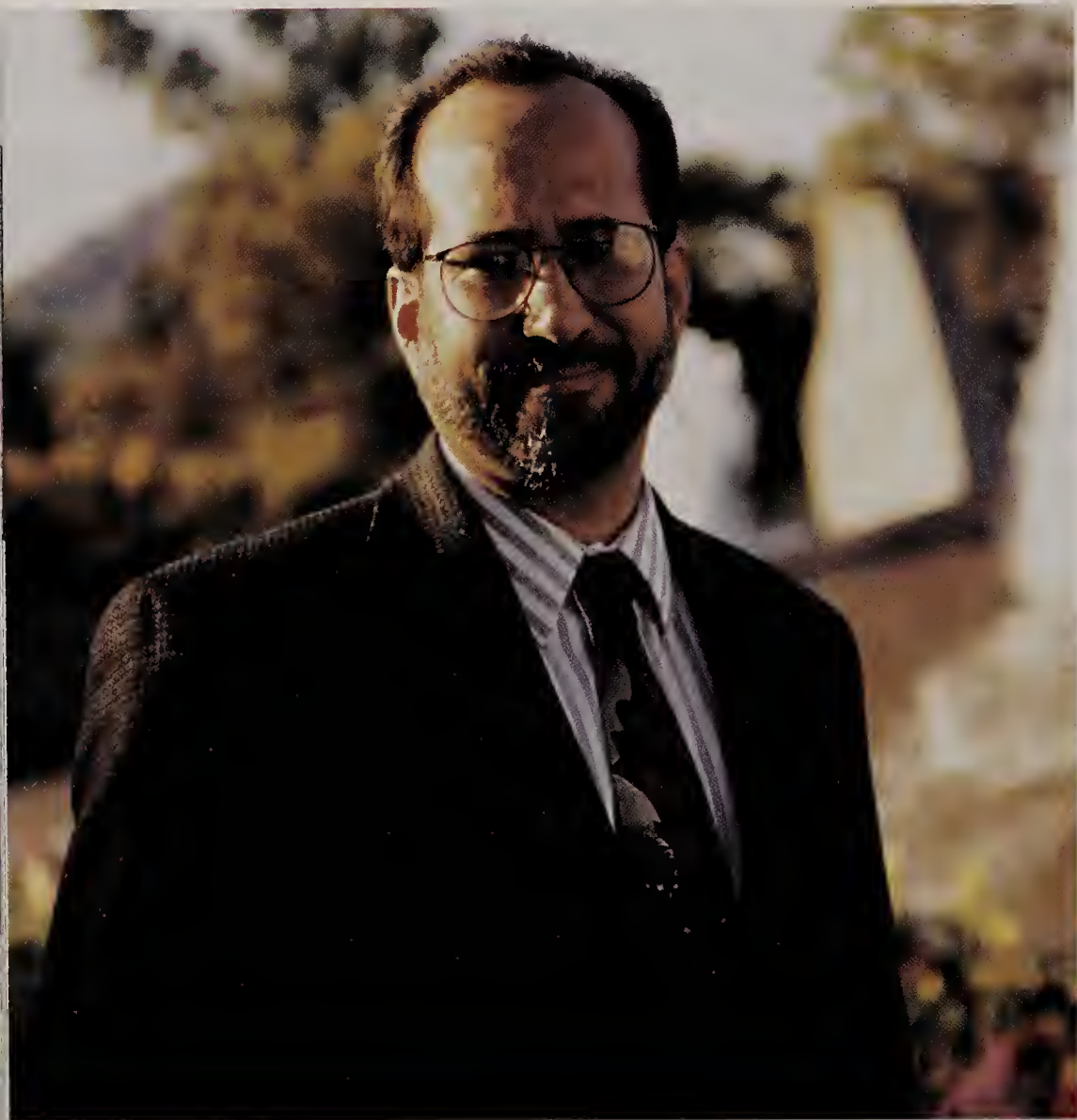
Two St. Louis-based data centers about 15 miles apart are at the heart of a private ATM network that Bridge runs over Sprint Business's ATM service. The centers, which each support about 200 machines, produce real-time data feeds that are pumped out to clients worldwide. With ATM running over certain LANs in the St. Louis and New York offices, Bridge in part already has the fabled end-to-end ATM network that proponents envision.

The company does dabble in videoconferencing, but the prime reason for adopting ATM so widely is throughput. "Traffic on the T1 lines was getting to be too high," explains McCormick, "and ATM has less latency than frame. We can deliver in 20 milliseconds now, where it used to be 90 milliseconds."

McCormick likes ATM's fast, reliable delivery to the desktop, its quality of service and the fact that its bandwidth is deterministic. "You get the whole pipe every time," he explains. And the company will shortly be running voice over ATM by the addition of an ATM switched virtual circuit card to its Lucent Technologies Inc.'s Definity PBX. "You can definitely say we're big ATM fans," McCormick adds.

Faced with ever-increasing bandwidth demands and the pressure to streamline the management of networks, other companies are likely to become ATM fans as well—as dictated by their own needs rather than the marketplace. If anything, the message from established customers and early evaluators alike is that ATM works and works well, provided it's deployed where and when it makes sense for an individual corporation's data and voice traffic needs. The protocol is already a clear winner in the WAN market and in the next three or four years will likely become a strong contender on the enterprise level as well. Most companies, however, probably will resist the marketers' siren song of end-to-end ATM and reserve desktop deployment for special high-bandwidth or video traffic cases only. **CIO**

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The city of Scottsdale, Ariz., included ATM in its \$2 million infrastructure improvement plan, says Brad Hartig, the city's enterprise manager.

works going to different locations," he says. "We needed to come up with some kind of wide area structure." By combining traffic through one ATM pipe, HealthSystem Minnesota centralized its multiple servers in one location and reduced the labor needed to maintain WAN traffic in general.

For the LAN environment, however, Hurlburt doesn't see a need for ATM. The company plans to redo its local area infrastructure over the next two years but will look at a switched Ethernet environment rather than ATM, he says.

Rather than build pure ATM backbones, a more common scenario will be to run frame relay over ATM, an option that takes advantage of ATM's speed and quality of service while still preserving the investment in frame at the LAN level. Many carriers are already offering upgrade strategies to move corporate traffic from frame relay to frame-over-ATM.

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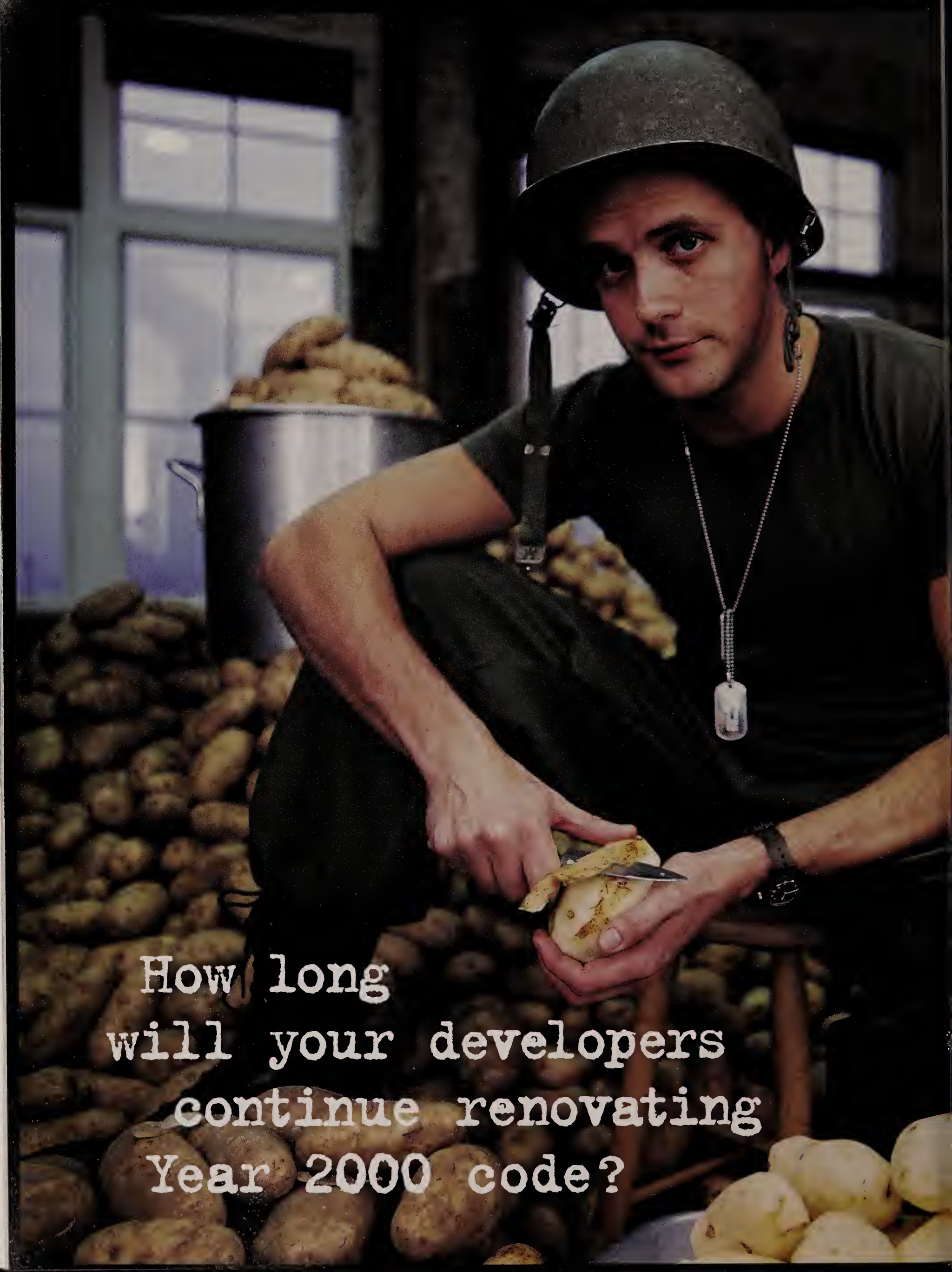
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A man in a military helmet and uniform is peeling a potato with a knife. He is wearing a dog tag necklace and a watch. In the background, there is a large pot filled with potatoes and a window. The scene is set in a kitchen or mess hall.

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Hi, Technology!

So you've just been introduced to your job as CIO and you're not exactly a technical wizard. To be successful, you don't have to pick up an engineering degree, but you do have to earn the respect of your IT colleagues.

BY MINDY BLODGETT

THOMAS MURPHY IS A GOOD-natured sort who can take a lot of ribbing. Which is fortunate, since as a former English major with a relatively sparse technology background who describes himself as "first and foremost a business person," the new vice president and CIO for Bristol Hotels & Resorts in Dallas has come in for some teasing from his IT staff.

Murphy says he doesn't mind. "I have certainly faced a challenge with some of the real wireheads under me. They can give me a lot of grief," Murphy says. "But I recognize where they are coming from."

Murphy, who was hired in July 1997, spent the first years of his career in the hospitality field on the startup team that developed the Washington, D.C.-based Marriott Hotels and Resorts' property management systems. Eventually he became that hotel chain's director of property management and telecommunications. Murphy typifies

a growing trend among companies toward hiring CIOs with nontechnical or less technical backgrounds than most CIOs had a decade or even five years ago. In fact, 35 percent of Stamford, Conn.-based Meta Group Inc.'s current client base for its Meta Executive Council service consists of nontechnical CIOs, up from 10 percent in 1994, according to Karen Rubenstrunk, service director for the council in Reston, Va.

These business-minded IT executives have spent much of their careers in such fields as marketing, finance and human resources, and the companies that hire them want CIOs who know their way around a mainframe but, most importantly, can explain business strategy to the least-technical senior executive in the business sector.

"More companies are realizing they can use technology as a competitive weapon as opposed to simply a cost reducer," says Russ Maney, an analyst in the Leadership Strategies Service at Forrester Research Inc. in Cambridge, Mass. "So the trend we are seeing is that companies are taking ex-CFOs and ex-business managers and putting them into CIO jobs because they bring a sense of business discipline with them."

Companies today are also spending big money on information technology, more than they ever have, in fact. Some CEOs may therefore be reluctant to turn over spending decisions to an IT officer who can't clearly tell senior managers how a technology expenditure will advance the business.

But for nontechnically oriented CIOs,

Reader ROI

COMPANIES ARE INCREASINGLY HIRING CIOs with nontechnical backgrounds in areas such as marketing and finance. This story will examine

- ▶ The advantages nontechnical CIOs bring to their jobs
- ▶ How those CIOs can gain credibility with more technically oriented IT staffers
- ▶ How they can keep abreast of technology



*Bristol Hotels
& Resorts CIO
Thomas Murphy
packs his schedule
with both IT and
business issues.*

the transition to IS is not always easy. This new breed faces challenges that their high-tech counterparts do not.

Taking Care of Business

One of the first challenges nontechnical CIOs are up against is the surprisingly complicated process of intertwining business and IT. Even if they were CFOs or other high-level business executives in the past, nontechnically oriented CIOs can quickly become associated with any negative feelings employees harbor toward the technology division, according to Maney. And such CIOs are often perceived by the rest of the business as members of the technical team rather than as business managers, says Bruce Stewart, vice president of the Gartner Group Inc.'s IT management practice in Stamford, Conn. That's why the CIO should work diligently to stay in the business loop and not take for granted access to the CEO or other senior executives, he says.

Ralph Szygenda, corporate vice president and CIO at General Motors Corp. in Detroit, agrees. Before he joined GM, he had worked in both IT and in busi-

ness operations. One of Szygenda's projects as CIO has been to push his IT executives to spend more time meeting and working with people in the business units rather than devote their entire workday to issues such as programming. "You have to darn well know what is going on in the business so that you can

a mandate from the CEO to use a very sharp pencil, so they start crossing off projects right and left," explains Maney. "Taking too narrow a cost focus can cut off a lot of creativity and potential."

Rather than get bogged down by budget concerns, CIOs should spend 50 to 70 percent of their time on business ini-

"I know enough about technology to keep my staff honest but not enough to second-guess the people who really know the technology."

—Marc Strohlein, CIO, Gartner Group

make sure IT and business are on the same page," he says. "What I am doing is trying to bring in the top leadership structure to make sure we are making the right investment in IT."

Another problem for nontechnical CIOs is that they may fall into the trap of obsessing over the bottom line to the extent that they lose sight of the importance of innovative and progressive technology. "Sometimes they come in with

initiatives, according to Jeff Leon, the managing director of the IS practice at Russell Reynolds Associates Inc., an executive recruiting firm in New York City. After all, companies expect a lot from their CIOs these days. They want IS to help increase sales, focus strategy and cut costs, not just provide administrative support or staff help desks. That's a tall order to fill, and it has sparked a shortage of technologically aware CIO candidates with business backgrounds—a situation exacerbating the already severe staffing crisis hitting IS at all levels (for extensive coverage of the staffing crisis, see *CIO*, Dec. 15 1997/Jan. 1, 1998).

Credibility Checks

CIOs have always needed the support of their IT staffs, and to get it, they have to establish credibility. But that can be especially difficult for CIOs who can't identify with their staff's professional experience. For them, the battle for backing must be particularly well planned.

"I have a lot of young hotshots working for me who think that if you don't know this stuff inside and out, you don't have credibility," says Bristol Hotels' Murphy. "I have overcome that by showing I'm not as dumb as I look." He has made an effort to explain to his staff that his job is to work with senior management to get the appropriate funding for what they do. "Without the kind of strategic vision I am bringing to the job, nothing we accomplish here in IT will be much good for the company," he tells

Steven Black, CIO of Physicians Health Services, balances his IT duties with his business goals.



them. "We don't want to do an application like networking just for its own sake; we have to figure out why we are doing it, what the business driver is."

To keep his team and himself focused on the business, Murphy brought in a director of IT operations to set up a formal help desk for the home office and 102 hotels so that application developers would no longer be distracted by internal users' computer problems. And he has a network developer he trusts to make networking a large part of the organization, leaving him to concentrate on the capital budget and on implementing the strategic plan.

Establishing credibility from the start makes it easier to deal with other issues as well. For example, every new CIO must decide whether to get rid of existing staff and build up his or her own regime or to hang on to senior IT staffers for their institutional and technical knowledge. Either option can be fraught with risk. Making too many changes can lower morale and reduce the momentum and progress of ongoing projects, but holding on to a disgruntled senior executive who was passed over for your job can leave you with a staff you might not be able to trust. While any incoming CIO can face this problem, IT staffs may be less confident in the abilities of a nontechnical CIO or suspicious of his or her lack of systems knowledge, making for a rocky honeymoon period.

Overhauling the staff when you are new to the department and to IT in general can be a difficult first test. Steven Black, vice president and CIO of Physicians Health Services Inc. in Shelton, Conn., confronted that problem when he took his job more than three years ago after working in Andersen Consulting's strategic services and systems integration groups. PHS had been one of his clients when he was at Andersen—he had worked on a strategic initiative for the HMO aimed at raising its profile in the health-care marketplace. One of his recommendations while consulting for PHS was to hire a CIO; previously, the company had a vice president of MIS.

When the time came to implement the strategies, PHS tapped Black to head up the effort as CIO, despite his lack of hard-core technology experience. "They saw me as a bridge between the technology and the business," Black says. "And what they valued was my project man-



When **William Beible** became CIO of Lukens Inc., he had to show his staff that his experience in business and the steel industry qualified him for the job.

agement skills. I can manage down risk and have a clear understanding of where a project is in a life cycle and achieve the results everybody is seeking."

But to achieve those results, Black had to take a critical look at the staff he had inherited. "The challenge coming in was that the incumbent vice president of MIS had just been let go because he didn't have the focus on the big business picture and the long-term objectives of expanding PHS's market and products," Black says. The COO believed Black had that focus and made the decision to dismiss the incumbent. That decision created some difficulties for Black, however, as the rest of the staff wondered if he was the one who had the person fired. "I was able to say honestly that I wasn't," Black says. "And then I set about to earn the respect of the people on the staff. It was a nerve-racking way to come into a job."

To gain the staffers' trust, Black met

with them individually and explained that the mission of the department had become strategic and business focused.

"We started right off with implementing a data warehouse," Black says. "I really took the staff through an evolutionary process of getting them to see that we had to function differently. Fortunately, I had a number of believers who had felt limited by the prior fellow's approach, so [the process] wasn't that difficult."

As a signal that times had changed, Black surveyed the business staff to get a sense of how well they thought the IS department served the company. The survey included such questions as whether the IS staff was delivering leading-edge solutions to business problems and taking a leadership role when solving problems rather than just acting as programmers. The business staff did not rate IS very highly.

Black wrote a memo to his staff out-

lining the survey results and pointing out where they could improve. Then he helped them do so. He held frequent staff meetings, during which he assigned people to various projects, such as setting standards. He also assigned senior IS staffers to various business units. "It was a good way to more fully integrate IS into the business by getting them directly involved with different aspects of the company," Black says. A year after the baseline survey, a second sur-

vey showed major improvements in how the business staff viewed the IS department's contributions to the business.

Sometimes motivating IS staffers isn't the problem; simply keeping them is. In the first few months after William Beible, vice president and CIO at Lukens Inc. in Coatesville, Pa., a specialty manufacturer of carbon, alloy and stainless steel plate, took over IS nearly two years ago after serving as the company's vice president of engineering, 5 out of 50 people left the IT department. "There were people who felt that because I wasn't a wirehead, that was a bad sign for IT. The attitude was, 'I'm going to move on to a company where IT means something.' They felt like I was the wrong flavor for CIO," Beible says. "Whether those people would have left anyway, who knows? But they were not people we wanted to lose.... We would have been better off if they had stayed."

His superiors supported him, Beible

"The perfunctory team-building exercises are meaningless," he says. "You need to engage them in projects, ask for volunteers to head up initiatives." And CIOs must follow through with those initiatives so that staff members know their input is taken seriously. "At one of our staff meetings, we set up a team to investigate an overtime on-call help desk pay policy," Black says. "Management is now reviewing the team's recommendation."

Staying Current

Once CIOs have earned the respect of the IT staff, they have to keep it alive. One important way to do that is to cultivate a knowledge of technology. But staying in touch with technology doesn't have to mean immersing oneself in the inner workings of, say, network computing. Nontechnical CIOs can make do with trade publications, seminars, consultants and other CIOs for insight. And

Helpful Hints

Common mistakes nontechnical CIOs should avoid

■ **Don't fall out** of the business-side loop once you cross over to IT. Make sure you know what the senior executives' IT needs are and they know what initiatives are underway in IT.

■ **Don't become too** obsessed with the bottom line. A narrow cost focus can stifle creativity and potential. Get to know IT and the projects that are underway before starting to eliminate costs.

■ **Don't underestimate** the technical challenges of the job. That attitude not only can alienate the IT staff, it can backfire with the senior business executives, who want the CIO to clearly articulate how a technology trend can advance the business.

■ **Don't fall out** of step with the business's strategic direction. Remember that your business knowledge can degenerate quickly and that you need to maintain your credibility with the business side by staying on top of the business.

■ **Make an effort** to network. If you stay too isolated, being a CIO will become a very lonely job. You need people you can call weekly to discuss ideas and technology.

—M. Blodgett

"We had tension between the business people and the IT people about whose vision of the future was right."

—Pallab Chatterjee, CIO, Texas Instruments

says, but he had to convince the IT staff that his strong business background and his deep understanding of the steel industry would stand him in good stead as CIO. He says it was no easy task. Adding to the obstacles was the fact that four years before Beible was appointed CIO, the company had acquired Washington Steel of Washington, Pa., and that merger has continued to create extra demands for IS as the two companies become integrated.

Beible turned his attention to hanging on to his remaining staff. He says that through group and one-on-one meetings, he shared his ideas about IT's new mission to advance the business and explained that his business acumen would actually raise the status of IT.

Both Beible and Black say meeting often to discuss staffing problems, technology initiatives and strategic direction can help improve and maintain communication as well as build a team feeling among the staff. Black advises CIOs to make sure those meetings have a focus and are not "just vague pronouncements about how to make the department work better."

they can rely heavily on trustworthy staffers well versed in technology.

Denis J. O'Leary, formerly the CIO of New York-based Chase Manhattan Corp. and now its executive vice president of consumer banking, became interested in technology as he progressed from a job as a corporate loan officer to a bank line manager. He eventually became CIO for the Chemical Banking Corp., which merged with Chase in 1996. O'Leary says that because the banking business today is so intertwined with technology, he continues to spend the vast majority of his time using IT to further the bank's goals, including working on Internet initiatives aimed at tying together the global entities that now make up Chase Manhattan.

O'Leary says that to be effective, he had to become familiar with technology to some degree. "Though I will never be as knowledgeable as the outstanding technical people, I have to be reasonably competent in certain areas, to be able to talk about TCP/IP and frame relay, and then have the insight to empower and listen to the experts," he says.

To that end, as CIO, O'Leary met

with up to three vendors a week. Before each vendor session, a member of his staff prepared an update for him on the topic to be discussed, analysts' reports, and the scope of Chase's relationship with the vendor. The briefings were particularly important if the CEO or another corporate officer planned to be present, which happened occasionally, and it also ensured that he never felt the vendor was taking advantage of him.

O'Leary also talked daily with members of his in-house IS department about direction and day-to-day operations. To better understand the issues and problems of the technical staff around the world, he still has an ISDN line at home and uses it to stay in close e-mail contact with his colleagues. As CIO, he also traveled frequently to Chase's many outposts, visiting an average of 10 countries and 10 states in a year. In addition, he held luncheons, dinners and working meetings with key technology and operations group managers domestically.

"It's important to set up a network of people you can rely on," O'Leary says. "I see communication as central to the effectiveness of the CIO, to share our vision as well as stay close to what we are learning about the reality of applied technology—what works and what doesn't, what business opportunities are available and what issues warrant my attention or intervention."

Pallab Chatterjee also looks to his staff and vendors for expert technological advice. Since spring 1997, he has served as both CIO for Dallas-based Texas Instruments Inc. and senior vice president of the company's semiconductor group. TI cast Chatterjee in the dual role because of his intimate knowledge of TI's business, he says. A 22-year TI veteran, Chatterjee rose through the company's semiconductor business, with a stint heading up TI's personal productivity products unit.

Despite his lack of IT experience, he is tackling several major IT projects, including rolling out SAP R/3 this year on Unix servers, which involves making a transition from a 25-year-old legacy system. "The CEO asked me to take this job on because he wanted to get TI back to using IT in a strategic role," Chatterjee says. Formerly, IT and the business had a somewhat adversarial relationship. "There was a lot of tension over technology choices between the business people



At Texas Instruments, CIO Pallab Chatterjee is turning IS into a service organization for the business.

and the information [technology] people about whose vision of the future was right," he explains. So Chatterjee has spent a lot of time forging a new relationship between IT and the business side and making IT "more of a service organization for the business."

Chatterjee says he spends 70 percent of his time on business initiatives, negotiations and managing suppliers. To keep on top of technology, he surrounds himself with knowledgeable staffers who handle much of the nitty-gritty tasks of analyzing technology decisions. Like O'Leary, he delegates in-depth research on technology, and he is also working closely with Andersen Consulting on the SAP rollout, meeting frequently with the Andersen consultants for progress reports as well as with the IS staff working directly on the project.

To compensate in part for what he calls his "very little formal education in computing," Marc Strohlein, senior vice president of operations and CIO of the Gartner Group, at least skims approximately 35 technical journals. Strohlein, who has a psychology degree, says he also relies on his technical staff. "I spent

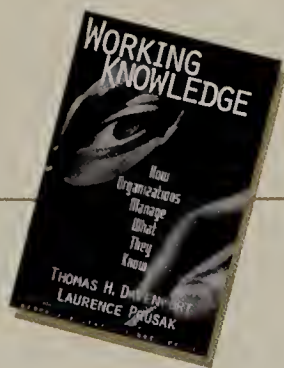
a lot of time building the team and they do a good job," he says.

Strohlein also learns what he needs to know through informal networking. "I spend a lot of time talking to peers, picking their brains about the technology out there, talking to [vendors] in Silicon Valley when I travel on business," Strohlein says. "You can learn a lot from each other. My approach is basically to know enough about technology to keep my staff honest but not to second-guess the people who really know the technology."

Like his peers, Strohlein doesn't worry that his own relative lack of technological expertise is a liability—in fact, he says, quite the contrary is true. "Sometimes I think my training in psychology is the most useful education I could have gotten for my current job," he says. "I need to be able to negotiate, build a good technical staff, understand people's needs. I spend less than 20 percent of my time on techie stuff. Anybody trying to play this role from a deeply technical standpoint would be in big trouble in today's world." **CIO**

Senior Writer Mindy Blodgett can be reached at mblodgett@cio.com.





Know What You Know

*Learn how valuable corporate knowledge
is acquired, created, bought, sold and bartered*

All healthy organizations generate and use knowledge. As organizations interact with their environments, they absorb information, turn it into knowledge and take action based on it in combination with their experiences, values and internal rules. Without knowledge, an organization could not organize itself; it would be unable to maintain itself as a functioning enterprise. We will consider five modes of knowledge generation: acquisition, dedicated resources, fusion, adaptation and knowledge networking. In each case, the conventions of language force us to discuss knowledge as a thing that can be managed. We want to emphasize, however, that knowledge is as much an act or process as an artifact or thing.

BY TOM DAVENPORT AND LARRY PRUSAK

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ILLUSTRATION BY JIM DEACON

ACQUISITION

Acquired knowledge does not have to be newly created, only new to the organization. British Petroleum gives a Thief of the Year Award to the person who has "stolen" the best ideas in application development. The company recognizes that, when it comes to organizational knowledge, originality is less important than usefulness. Texas Instruments has created a Not Invented Here, but I Did It Anyway Award for borrowing a practice from either inside or outside the company. The Spanish proverb "Well stolen is half-done" sums up this idea succinctly. The knowledge-focused firm needs to have appropriate knowledge available when and where it can be applied, not to generate new ideas for their own sake.

The most direct and often most effective way to acquire knowledge is to buy it—that is, to buy an organization or hire individuals who have it. Of course, not all corporate purchases are knowledge acquisitions. Companies buy other companies for various reasons: to generate additional revenue, to achieve a strategic size or product mix, to get access to new markets or to gain the skills of a senior management team (this last reason, however, borders on knowledge acquisition). Increasingly, firms acquire other companies specifically for their knowledge. They are often willing to pay a premium over the market value of the company purchased because of the value they expect to get from adding that new knowledge to their own knowledge stock. One recent example of this is IBM's 1995 purchase of Lotus. IBM paid \$3.5 billion, which was 14 times Lotus's book valuation of \$250 million. Clearly, IBM did not pay that amount of money for the current revenue generated by Notes and other Lotus products or for Lotus's manufacturing and sales capabilities. The \$3.25 billion premium IBM paid represents its appraisal of Lotus's unique knowledge of Notes and other collaborative software applications. The minds that invented Notes are more valuable than the software itself.

In addition to being purchased, outside knowledge can be leased or rented. A common type of leasing is a firm's financial support of university or institutional research in exchange for the right to first commercial use of promising results. The drug company Hoechst, for example, supports research at the Department of Molecular Biology at Massachusetts General Hospital in hopes that it will lead to the development of profitable new drugs. R&D efforts are always speculative, and it is not easy to predict when or if research will pay off. However, it should be possible over time and in the aggregate to calculate the value of leased knowledge in terms of the eventual returns that are derived from the funded research.

Renting knowledge really means renting a knowledge source. Hiring a consultant for a project is an obvious example. Unlike rentals of equipment or facilities, knowledge rentals are likely to involve some degree of knowledge trans-

fer. Although the knowledge source is temporary, some of the knowledge is likely to stay with the firm. Some clients we have worked with now specify in their consulting contracts that consultants' knowledge be made available in some structured, codifiable format. And consultants are beginning to market their services partly on the basis of transferring knowledge to clients. For example, more than one high-tech consulting firm now offers technical training in the software package SAP if the client employs these firms to implement the package.

As with so many investments in knowledge generation, intentions are important: A firm needs to know what it wants in order to have a good chance of getting it. High-level consultants are sometimes surprised at how little clients ask of them in terms of knowledge transfer. Firms that hire them for a day or a week at considerable expense might be expected to squeeze as much knowledge out of them as possible. But they usually do not ask the questions that would help them absorb that expertise in practical ways.

DEDICATED RESOURCES

A customary way to generate knowledge in an organization is to establish units or groups specifically for that purpose. But since the financial returns on research take time to materialize and may be difficult to measure when they do come, a focus on near-term profits may create pressure to cut costs by cutting R&D. While no part of a business can be funded indefinitely if it generates no measurable value, a narrow bottom-line view of that return can lead to "savings" that deplete vital knowledge-generating resources.

The premise behind separating R&D from other parts of the firm is to give researchers the freedom to explore ideas without the constraints imposed by a preoccupation with profits and deadlines. However, this distance may be difficult to bridge when the time comes to transfer the results of R&D to the wider organization. Knowledge creators and users may not even speak the same language.

Probably the most notorious case of a costly transfer gap occurred at Xerox's Palo Alto Research Center in the mid-1970s. The knowledge workers at Xerox PARC invented key elements of the graphical interface computer, including the mouse, graphical icons and menus. Ironically, the independence that made

this breakthrough possible probably contributed to Xerox's inability to understand its importance and potential value. They were not close enough to the research to evaluate the newly created knowledge. Steve Jobs, on the other hand, was prepared for those new ideas by his work at Apple (as well as by culture and temperament) and quickly grasped their significance. A brief tour of Xerox PARC was all he needed to gather the fruits of research funded for years by Xerox. He went back to Apple and built the Macintosh.

In His Own Voice

At www.cio.com/CIO, you can hear Larry Prusak's complete responses to such questions as

- **Why is this the time to write about knowledge as an asset?**
- **How would you respond to a CEO who says, "We've always exchanged knowledge. What's the big deal?"**
- **How does a company know what it knows?**



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FUSION

Whereas the R&D approach is predicated on reducing the pressure and distractions that can stifle productive research, knowledge generation through fusion purposely introduces complexity and even conflict to create new synergy. It brings together people with different perspectives to work on a problem or project, forcing them to come up with a joint answer.

In *The Knowledge-Creating Company* (Oxford University Press, 1995), [Ikujiro] Nonaka and [Hirotaka] Takeuchi cite Matsushita's development of the first automatic breadmaking machine as an example of diversity and creative chaos in action. Matsushita combined three product divisions with different cultures to develop a successful breadmaking machine, realizing that it needed the variety of knowledge possessed by groups that had previously made rice cookers, toasters and coffeemakers, and food processors. The new product combined the computer-control expertise of the first

Time, not physical space,
is the corporate resource
most likely to be begrudged
to knowledge activists.

group, the second's experience with induction heater technology and the third's knowledge of rotating motors. The creative chaos came from a breakdown of old assumptions and ways of working, an intentional shake-up of the status quo that, as conventionally portrayed, is not innovative. The combined groups (a total of 1,400 employees) initially almost "spoke different languages."

Although fusion can lead to powerful results that are unobtainable in other ways, it is not a shortcut to knowledge generation. A significant commitment of time and effort is required to give group members enough shared knowledge and shared language to be able to work together. Careful management is also necessary to make sure that the collaboration of different styles and ideas is positive, not merely confrontational.

Here are five knowledge management principles that can help make fusion work effectively:

1. Foster awareness of the value of the knowledge sought and a willingness to invest in the process of generating it.

2. Identify key knowledge workers who can be effectively brought together in a fusion effort.

3. Emphasize the creative potential inherent in the complexity and diversity of ideas, seeing differences as positive rather than sources of conflict and avoiding simple answers to complex questions.

4. Make the need for knowledge generation clear so as to encourage, reward and direct it toward a common goal.

5. Introduce measures and milestones of success that reflect

the true value of knowledge more completely than simple balance-sheet accounting.

ADAPTATION

In "Microcosmic God," a 1941 science fiction story by Theodore Sturgeon, the main character creates a miniature world of beings who live and evolve extremely rapidly. He forces them to innovate by imposing various environmental threats on them. They react to storms, heat, drought—even a metal plunger moving inexorably down from their "sky"—with a steady stream of inventions and discoveries, from new insulating materials to power sources to super-hard aluminum. The crises in their environment act as catalysts for knowledge generation.

"Adapt or die" is their fate; so they adapt and advance.

The story provides a vivid metaphor for the way external (and sometimes internal) changes cause businesses to adapt. New products from competitors, new technologies, and social and economic changes drive knowledge generation because firms that don't change in response to changing conditions will fail. Success is often the enemy of innovation; it has been called the winner's curse. Lulled by past success, companies sometimes fail to see that change is happening or to acknowledge that it can affect them. The appearance of low-cost, high-quality Japanese cars on the U.S. market changed the automotive world, but decades of dominance blinded American automakers to the magnitude of the threat. Similarly, Sears ignored the changes that Wal-Mart was making in the retailing environment until shrinking sales

forced it to face reality.

A firm's ability to adapt is based on two principal factors: first, having existing internal resources and capabilities that can be utilized in new ways, and second, being open to change or having a high "absorptive capacity." The most important adaptive resources are employees who can acquire new knowledge and skills easily. Since the best predictor of mental nimbleness is proven experience in taking on new tasks, firms should seek out employees who have already mastered a variety of roles and skills. After they've been hired, employees should also be encouraged to change jobs often, to build and manage their own skill portfolios, and to take "learning sabbaticals" to master new work-related disciplines.

NETWORKS

Knowledge is also generated by informal, self-organizing networks within organizations that may over time become more formalized. Communities brought together by common interests usually talk in person, on the telephone, and via e-mail and groupware to share expertise and solve problems together. When networks of this kind have enough knowledge in common to be able to communicate and collaborate effectively, their ongoing conversation often generates new knowledge within firms. Although it may be difficult to codify, this process can add to the knowledge of the entire company.

In the absence of formal knowledge policies and pro-

Management: The Oral Art

If you tell a good story, your assets at the favor bank will soar

Oh sure. Knowledge management. What will they think of next? Some egghead awakens at midnight and shouts, "Eureka!" at the brilliant notion that information shared is better than information hoarded. So what else is new?

Actually, according to Larry Prusak, quite a bit. Prusak, a managing principal of the IBM Consulting Group in Boston and co-author with Tom Davenport of *Working Knowledge: How Organizations Manage What They Know* (Harvard Business School Press, 1998), has been asking executives the same question for three or four years: "Where do you get the insight you need to run your business?" He says the answer is almost always, "We talk."

"Management has always been an oral art, but perfect information has never meant perfect decisions," Prusak says. He points to IBM, a company that in 1987 knew all it needed to know to realize that desktops indeed posed a threat to the glass-house

mainframes on which the company had built a fortune but which nevertheless flirted with financial disaster. "What has changed is that technology has made 'distributed cognition' possible. Space and time have been diminished as inhibitors to teams, groups and the distribution of collected intelligence."

What's more, in their book, Davenport and Prusak put forward the proposition that knowledge is subject to the same market forces as any other asset or commodity. When knowledge is plentiful, like talk, it gets cheap. When knowledge is scarce, it rises in value. But since knowledge is, by its nature, usually scarce, a set of players skilled at buying, selling and even brokering what there is to know have always been around. Just because there is no exchange that measures value in dollars and cents, don't make the mistake of believing there is no price. In terms of in-house knowledge distribution, Prusak likes to point to what Tom Wolfe in *Bonfire of the Vanities*, his novel about heavy-hitting Wall

Street bond marketeers, calls "the favor bank," that hypothetical cosmic mechanism that distributes justice to those who have cast a bit of bread upon the waters.

Prusak expects that knowledge brokers and arbiters—those people who know who knows and where to find them—will soon be more valued. While informal arrangements have generally been the modus operandi for knowledge brokers, such professionals as company librarians may come into bigger compensation packages soon. They have been marginalized until now because, Prusak says, they are too democratic. "They're nice people and treat everyone the same. That's no way to build a balance at the favor bank," he explains. "Business interaction has always relied on reciprocity, and people have always calculated their expenditure in time in terms of a possible future reward."

Indeed, he concedes that a quick calculation was why he granted *CIO* the time for an interview.

—Perry Glasser

cesses, networks act as critical conduits for much innovative thinking. Consider, for example, a series of events that occurred recently at a U.S. subsidiary of Hoechst that makes polyester fibers. During a lunch with colleagues, a Hoechst R&D technician who had recently come back from a conference on synthetic fiber manufacturing in Europe mentioned a particular presentation regarding a new material. One of his colleagues passed on some details of the lunchtime discussion to about 18 global peers via an informal e-mail network. Three weeks later, one of these networked researchers mentioned the e-mail message to a company executive during a flight they took together to visit a client. The executive brought the matter up with a team he was on whose mandate was to look at new business opportunities. Soon Hoechst formed a small executive group to look further into this promising material.

This story resonates with readers familiar with how knowledge gets around in organizations. It shows how extensively an informal network can generate knowledge when each participant adds an incremental portion. At the same time, it is obvious how large a role chance played in getting the knowl-

edge where it could be used in this particular instance. How easily the knowledge brought back from the conference might never have reached the group that needed it!

The common denominator for all these efforts is a need for adequate time and space devoted to knowledge creation or acquisition. In companies committed to dedicated resources, space not only means the laboratories and libraries in which discoveries can be made but also the meeting places where knowledge workers can congregate. In some instances, the shared space may be electronic, but meeting places of some kind must exist. Unfortunately, time, not physical space, is the corporate resource most likely to be begrudged to knowledge activists. It is the scarcest of all resources, the one impossible to replicate and yet most essential to genuine knowledge generation. **CIO**

Tom Davenport is a professor and director of the Information Management Program at the University of Texas at Austin. He welcomes reader comments at davenport@mail.utexas.edu. Larry Prusak is managing principal of the IBM Consulting Group and can be reached at 617 895-2320.

Emerging Technology

THE STATE OF THE ART,
NEW PRODUCTS
AND STAYING AHEAD
OF THE CURVE

Edited by Howard Baldwin

OK, Folks, Look But Don't Touch

Setting up your e-commerce system to be both accessible and protected is tricky business, but it's getting easier

BY JOHN EDWARDS

ANY CIO ENGAGED IN ELECTRONIC COMMERCE over the Internet faces a paradox: opening the system for transactions while keeping it safe from intruders. Although the tools are available—firewalls for protection and tunnels for letting partners in safely—implementing, configuring and managing them has proved to be a difficult and complex task for many organizations. Since the typical firewall or firewall-tunnel combination is made up of many tools, often from different vendors, getting the technology to perform the task it was designed for is hardly a snap. Although most products now offer GUIs and other features designed for ease of use, the challenges remain formidable.

Firewalls play a critical role in virtually all types of electronic commerce projects—from safeguarding Web sites to protecting order processing systems. Tunnels, on the other hand, enable organizations to create virtual private networks (VPNs) that interconnect buyers, suppliers and other business partners. Tunnels are based on encrypted Internet protocol packets that provide a high degree of security to confidential business communications.

Although firewalls and tunnels play an increasingly important role in e-commerce security, many IT professionals are still unfamiliar with the concepts. More education and day-to-day experience would help CIOs and their managers become confident and comfortable with

these vital security tools. "Electronic commerce is the brave new world of security," says Derek Smyth, vice president of marketing and business development for Ironside Technologies Inc., an electronic commerce software vendor based in Toronto. "CIOs and managers must keep pace with security issues through reading and training, or they'll learn their lessons the hard way."

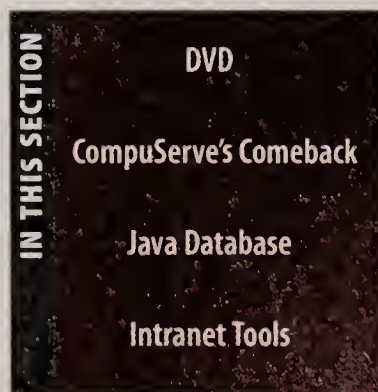


Jim Burdick, senior technology manager with Trident Data Systems, a Los Angeles-based IT consulting company that specializes in information protection, agrees. "I think most CIOs are behind the security learning curve," he says. "The field has changed so rapidly over the past couple of years that even security experts are struggling to keep up."

Despite the learning struggle, most security experts maintain that rock-solid protection can be achieved with only a minimum of difficulty. Here are some of their suggestions for targeting e-commerce security.

Map Your Security Goals

Many CIOs begin an e-commerce project with only the vaguest notion of the venture's overall security requirements, observes Win Treese, director of security for Open Market Inc., a Boston-based e-commerce software vendor. "You really need to map your goals in advance," he says. "Security should be an integral part of the project, not an afterthought." Treese says CIOs and their managers need to analyze the security requirements of each e-commerce component prior to its acquisition rather than assess the total system after implementation. "If you



Technology Profile

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Leaders in I/O Technology

The demand for device driver portability between operating systems and host platforms, combined with increasing requirements for intelligent, distributed I/O processing has led to the development of the Intelligent Input/Output, or I₂O specification. BMC Software and Intel Corp. are working closely with the I₂O Special Interest Group (SIG) to bring I₂O-compliant technologies to market, including integrating PATROL Management solutions with the Intel i960RP I/O processor.

"The importance that the Intel/BMC relationship brings to the market is that BMC innovation in I/O technology naturally makes them a leader in this collective new I/O-centric industry," states Alan Steinberg, Director of New Business Development, Connected P.C. Division at Intel. "Currently we have companies coming in from the desktop and from other areas of the industry that don't necessarily have the Enterprise experience BMC Software has to deal with the type of I/O that is needed in what could be called the new 'open mainframe' world."

Steinberg envisions a world where Microsoft will provide the main operating system, Intel will provide the hardware architecture and BMC Software will contribute the key I₂O-compliant management technology. BMC Software's role will be to help architect what Steinberg calls the "highly available, highly manageable open system mainframe" on the I/O space.

Bob Beauchamp, Vice President of Strategic Marketing and Corporate Development for BMC Software, agrees. "The pervasiveness of the i960 chip in the Windows NT and NetWare environments, combined with BMC Software's PATROL technology, will empower

customers with unprecedented management and monitoring capabilities from the application to the motherboard."

Clearly, the ability to gather statistics regarding I/O is a great step forward. The PATROL Application Management Suite completes the picture by correlating I/O statistics with the applications that are utilizing the I₂O components or sub-system. This allows unprecedented optimization capabilities, such as automated load balancing, cache reallocation, and the rerouting of network traffic. All of these capabilities can be performed on demand and are based on the performance requirements of the applications.

Currently, no two vendors come as close as Intel and BMC Software in providing this comprehensive approach to I/O processing and manageability.

"We've moved into a new paradigm where I/O is as important as the central CPU technology," states Steinberg. "This shift will allow BMC to proliferate its management product line in the open systems environment. Pairing Intel I/O technology with PATROL is just the very beginning. It's the first product of many, as this new I/O-centered technology emerges into the marketplace, and we think it's going to be an exciting ride."

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Emerging Technology

wait until after the system has been installed, you haven't thought about security soon enough."

Treese adds that e-commerce security covers both technological and operational issues. "You may have an extremely secure lock on your home's front door, but it's useless if you don't use it properly. Likewise, the best technology in the world won't protect your electronic commerce system if it isn't implemented and managed properly."

Smyth suggests seeking outside help from an experienced security systems integrator. "With security, you have to take into account what protocols are running, the transport, telecommunications devices and so on. There are a lot of things to consider, and it's too much to expect the typical CIO and his team to handle all of these things."

Solid security management hinges on considering the implications of an action before making a decision, says Christopher Klaus, founder and chief technology officer of Internet Security Systems Inc., an Atlanta-based supplier of network security assessment tools. He notes, for example, that managing electronic commerce projects often requires IS executives to balance an organization's business needs against security requirements. "As you open ports to allow audio, video and other technologies, you're also opening up more ways for a hacker to enter your system," he notes. "The trick is to make sure you have the necessary safeguards in place before you open a new service."

Firewalls Keep the Bad Guys Out

Firewalls are one of the most important tools in the security arsenal. The hardware-software combination stands as a barrier between an organization's Internet resources and the outside world. The technology comes in two basic forms: software that's installed on an Internet server, or a standalone "box" that sits in front of the Internet server and protects the entire internal network from the outside world. Smyth notes that a software-only firewall can provide solid protection for a small-scale e-commerce project—such as a modest Web site—while a box-based firewall can handle the security

A Fatter Platter

The "V" in DVD really does stand for versatile—it's not just for movies anymore

IT'S TIME TO UPDATE THE OLD JOKE about getting the best bandwidth from a CD sent by Federal Express. CDs are taking a giant leap forward with the new Digital Versatile Disk standard. The same size as a traditional 640MB compact disc, a DVD can hold a minimum of 4.7GB of data, or more than seven times as much data. Just as important, DVD drives can read CDs.

You've certainly heard about DVD as the next upgrade for your

ready CD jukeboxes from NSM Jukebox of Bensenville, Ill.

The next incremental development in DVD carries even more impact. Just as CD-ROM has spawned rewritable and erasable disks, so too will DVD. The unfortunately named DVD-RAM standard (it has nothing to do with random access memory) lets you record or archive gigabytes of data either for legal reasons or near-line storage. Expect that capability late next year or early in 2000.

But once DVD-RAM arrives, there's a third aspect beyond capacity and archiving that opens up a whole new kettle of fish, according to Senior Analyst Mark

Hardie of Forrester's Entertainment & Technology Strategies research service. That much storage can handle pretty much everything digital that typical users need, including their operating system of choice. With DVD's portability and its familiar form factor to boot (no pun intended), users will be able to sit down

at any DVD-enabled machine, slip in a DVD-RAM disk that's been configured, fire up the machine and start working. "How do I support and maintain 5,000 PCs?" posits Hardie. "If each individual can have his or her life on a DVD-RAM disk, I just have to make sure they have a copy stored someplace. A machine that's broken can be replaced in minutes and the user doesn't have any issues about how it's configured."

It's the same old story: A technology comes along, solves a problem and brings with it the possibility of a whole new set of unexpected changes. Oh, well—it looks like versatility has its downside, too.

—Howard Baldwin

DVD

videocassette recorder, bringing CD clarity to home-movie viewing. An hour of video gobbles up about 2GB of space, so your average two-hour movie fits perfectly on one side of a DVD. In fact, the V originally stood for video, but the industry recognized that the V really stood for versatility. That's where it becomes important for CIOs.

How important? Forrester Research Inc. estimates that while just 10 percent of PCs will ship with DVD-ROM drives this year, by 2002, that figure will jump to 60 percent. (We're using the term "DVD-ROM" to differentiate computer-based DVD from video DVD and audio DVD, although the convergence between entertainment and computing devices will blur these lines.)

With 4.7GB of capacity, suddenly content-rich computer-based training disks becomes easier to create. You can search for reference material without accessing multiple disks. As for network access to DVD, you can already get DVD jukeboxes from Procom Technology Inc. of Irvine, Calif., and DVD-



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Ross Holman — CIO — PageNet

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Emerging Technology

requirements of an entire enterprise.

A basic firewall features two key components: gates and chokes. Gates allow data to pass between two networks. Chokes block incoming packets not destined for the gate and block outgoing packets not coming from the gate. In other words, any packet that doesn't have the gate address in its origin or destination address is blocked. Chokes can also be set to block specific types of packets that may be the work of a hacker attempting to invade a system, such as Telnet packets. The gate is typically a gateway computer; the choke is often an intelligent router, located between the gate and the external network.

A single firewall isn't sufficient for critical e-commerce applications, such as Web retailing, says Ralph Poore, leader of Ernst & Young LLP's Dallas-based Southwest area electronic commerce practice. "You really need to establish a 'demilitarized zone' with at least two firewalls and/or routers that act like firewalls," he states. Poore notes that by doubling the firewall protection—perhaps using products from separate vendors—organizations can create a security "air gap" and can significantly lessen the chance that a hacker will figure out a way into a system.

Tunnels Let the Good Guys In

While VPNs are very good at stopping hackers and other unauthorized users, the technology's real value lies in its ability to bring people together. In addition to its security attributes, tunneling offers organizations a relatively inexpensive way to link workers over both long and short distances. "Since most organizations don't fully utilize their T1 or other pipeline into the Internet, a VPN can be easily 'piggybacked' onto the connection," notes Burdick. He adds that most of the cost of setting up a tunnel comes upfront and that there's typically little or no additional monthly operating expenses.

Finding the right mix of hardware and software products to adequately protect an e-commerce project is a task that can challenge the abilities of almost any CIO. Until recently, the only available option was to mix and match security products and services from an array of different vendors, since no single company offered a complete solution to e-commerce security needs. But Smyth believes that the situation is rapidly changing. "A lot of vendors are beginning to put together corporate firewall bundles," he says. "Companies like Cisco and Bay Networks are bundling hardware and software together to give various levels of security, depending on what the customer is looking for."

Combining Both Tools

Burdick advises organizations planning to create a

LEADING

EDGE

CompuServe Returns to Its Roots

LONG BEFORE AMERICA ONLINE INC. was a gleam in Steve Case's eye, CompuServe Inc. was delivering text-based business information over 300-baud modem lines. After AOL's September 1997 acquisition of the interactive services division of CompuServe, the venerable service has returned to its roots of providing business and technical information.

Its new service is called **C** from CompuServe (www.c.compuserve.com), which was launched in December. It's divided into three levels. The guest level is similar to CompuServe's current service: access to 500 forums varying in content. Newly added are hyperlinks to Web sites of similar topics. While access is free, content is available on a read-only basis. The



limited member level adds access to several hundred research databases, available on a pay-per-view basis. There is no other fee other than the download charge, which is set by the individual database providers. To register, users supply a credit card number and then access the information at any time.

The third option, the member level, is broken into three parts. Users can post and receive messages from the forums; subscribe to an electronic communications package that includes e-mail, voice mail, fax and paging services; and subscribe to Computing Pro, an online publication for computing professionals. The cost of the member level has not been decided but will be less than \$10 per month, according to the company. Contact CompuServe at 614 457-8600.

The Incredible Shrinking Database

THE IMPORTANT THING TO REMEMBER about Java is that it was originally built to run on the box from your cable-television provider—that's why it needed to be small and independent of any computer operating system. But no matter what the platform, a lot of information either originated in or is headed for a database, and that's the logic behind Oakland, Calif.-based Cloudscape Inc.'s **JBMS**, a Java-based object-relational database management system. The company's other targets include sales-force, catalog and calendar applications used by mobile professionals, and computer-based training applications.

In essence, JBMS is a data manager that can be embedded into Java applications and extended with Java class libraries that handle data from traditional SQL databases. That way, information can be downloaded or uploaded at regular intervals. JBMS's memory footprint is less than 1.5MB and the executable file can be compressed for transmission to as little as 600KB, according to the company.

A downloadable evaluation version of JBMS is available now, with a new version to be available in the second quarter of this year at a cost of \$195 per development or deployment seat. Cloudscape can be reached at 510 873-0900 or at www.cloudscape.com.

A P P L I C A T I O N F O R M

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The CIO Magazine Enterprise Value Awards honor technology-enabled business achievement arising out of effective business/IS collaboration.

Entries will be judged on the following criteria:

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- **CUSTOMER IMPACT**
- **FINANCIAL IMPACT**
- **TECHNICAL EXCELLENCE**

We invite applicants to consider the broadest possible spectrum of enterprise value. The following list of IT-enabled benefits is not inclusive but rather is intended to help guide applicants' thinking:

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- Transaction process is more rewarding/less time-consuming

FINANCIAL IMPACT

- Lower costs due to streamlined operations
- Increased profits
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- Overall technical innovation
- Uniqueness of solution within the organization's industry
- Complexity of the problem or opportunity the system addresses

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1. The system must have been fully operational prior to July 1, 1996.
2. Entrants must agree to be featured, along with their systems and organizations, in a CIO article.
3. Entries must be complete.
4. Entries must be on 8.5-by-11-inch paper, one side per sheet.
5. The application form may be reproduced.
6. Up to three entries from one company will be considered, but each entry must be submitted separately. Only one entry per company can win.
7. Entries must be made jointly by the IS executive sponsor AND by the business sponsor for whom the system delivers value.
8. IT vendors, public relations and advertising companies, consultants and other third parties may NOT apply on behalf of another company. They are encouraged to forward this form to the "owner" of the system or to contact CIO Communications to recommend that an application form be sent to the client.
9. All entries must be computer generated or typed; no handwritten entries will be accepted.
10. When feasible, an additional copy of the entry should be sent on a 3.5-inch disk. Electronic entries must be limited to word-processing and spreadsheet packages that are compatible with Microsoft Word and Microsoft Excel.

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Telephone Fax

E-mail

B. Name of entering business-unit executive/sponsor

Title

Name of division, department or unit

Address

City

State Zip

() ()

Telephone Fax

E-mail

3 SUPPORTERS

Please list four people who are willing to be interviewed with regard to the system, its development, its use and the value returned. At least one should be a member of the technology team that developed the system and should have played a significant role. At least one should be a primary user from the sponsoring business unit. The other two may be from either organization or may represent suppliers, customers or others intimately familiar with the system.

A. Name

Title

() ()

Telephone Fax

E-mail

Reason for inclusion

B. Name

Title

() ()

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Reason for inclusion

C. Name

Title

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Title

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For more-detailed information on the type of data the judges would like to see, including a model application, please visit our Web site at www.cio.com/eva.

4 THE NOMINATED ORGANIZATION

Please tell us about your organization (company, business unit, agency) in 500 words or less. Include information on

- When the organization was founded
- Mission statement
- Major products and services
- Markets served
- Your organization's standing within its industry
- Any other data you believe to be relevant in terms of general background

5 THE NOMINATED SYSTEM

Tell us about the nominated system and demonstrate its importance to the organization by completing the following sections. Please limit your material to one or two pages.

System Description: In one sentence or less, describe the system or IT initiative you are nominating (e.g., order-entry or sales-automation system; global intranet).

Date Deployed: Please indicate when the system was fully rolled out. If all users were not online by **July 1, 1996**, please detail what went live when.

Technical Profile: Briefly describe the technology of the nominated system, including its architecture; hardware, software and development tools used; and networking/communications hardware, software and services. Please include the names of all major vendors and products.

6 EVALUATION CRITERIA

Describe the primary business objectives of and value delivered by the IT investment. Please limit this section to five pages.

Statement of Value: List the three most important contributions the system has made to the business (these can demonstrate strategic, customer or financial impact as described in the "Defining Value" section on the first page of the application form). Please limit this answer to a few hundred words.

Strategic Impact: Define the ways in which the system has had strategic impact and describe in detail how the system delivers that impact. Make sure to include supporting data. For some examples of this, please refer to our Web site at www.cio.com/eva.

Customer Impact: Describe in detail how the system has benefited your customers. You may include examples from the organization's ultimate customers (consumers), the business users of the system, and suppliers or business partners affected by the system.

Financial Impact: Provide a detailed, one-page summary of the nominated system's investment costs (including all upfront development expenses and annual maintenance charges). Also provide details of the financial returns (including increased profits, reduced costs and indirect cost-avoidance). Please be specific about where the money is going/coming from and distinguish between actual and projected costs/returns. This data is required to make it past the first round of judging. If your company is selected as a finalist, you will be required at that time to fill out a standardized table detailing specific costs and returns.

Technical Excellence: Describe the degree of overall technical innovation of the solution (does it employ cutting-edge technology?); its uniqueness within your industry (is this an industry first or second, or is this a common solution?); and the complexity of the problem or opportunity it addresses. Please be as specific as possible and include supporting data.

7 OTHER CONSIDERATIONS

Scope and Impact: Identify the functions (e.g., customer service, manufacturing, sales) that were changed by the system, the nature of those changes and their impact on the business.

The Importance of IT: Explain the importance of the IT component to the overall business change. Could the results have been achieved without IT?

Collaboration: Describe how the business unit and IS organization worked together throughout the project, from concept to implementation. Who initiated the effort? What were the specific tasks fulfilled by the business unit? By the IS organization?

8 TRUTH OF INFORMATION RELEASE

The following release must be signed by both nominating executives if the application is to be considered. Unsigned releases will invalidate the entry.

I hereby state that the information provided is true and complete to the best of my knowledge and belief.

I authorize the release and use of, in connection with the CIO Enterprise Value Awards program, any and all materials furnished by me or others at the company contacted for this judging. I understand that information submitted on this application or subsequently gathered during the evaluation and judging process may be used in articles or any other type of publicity relating to the CIO Enterprise Value Awards program.

I also authorize the release and use of my name, my company's name and my likeness, including but not limited to any photographs and any recording of my voice or image that may be taken of me for CIO magazine. I agree that no compensation shall be due me or my company for such usage.

I recognize that failure to meet these conditions or to provide sufficient material that can be published can cause the application to be rejected at any point in the process at the sole discretion of the sponsors.

1. Signature of nominating IS executive

Date

2. Signature of nominating business executive

Date

9 OTHER EDITORIAL OPPORTUNITIES

If you are not selected as an award recipient, are you willing to be contacted for inclusion in other articles in CIO magazine?

Yes ☐ No ☐

How did you learn about the CIO Enterprise Value Awards program?

- | | |
|--|---|
| ☐ CIO magazine | ☐ Academician |
| ☐ cio.com Web site | ☐ Advertising agency |
| ☐ Consultant | ☐ IS staff member |
| ☐ Systems integrator | ☐ Other publications |
| ☐ PR agency | ☐ Vendor |
| ☐ Other (please identify) _____ | |

CHECKLIST

Have you filled out...?

- ☐ Company/Business-Unit, Entrants and Supporters Information

Have you included on separate pages...?

- ☐ Nominated Organization
☐ Nominated System
☐ Evaluation Criteria
☐ Other Considerations

Have both entrants signed and dated...?

- ☐ Truth of Information/Release

Have you checked off...?

- ☐ Other Editorial Opportunities
☐ How you learned about the CIO Enterprise Value Awards program

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1998

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Procter & Gamble
State Street Global Advisors
Tech Data Corp.
U.S. Environmental Protection Agency

1997

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The Chase Manhattan Corp.
Fidelity Investments
MacGregor Medical Association
Schlumberger Ltd.

1996

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Gensym Corp.
McDonnell Douglas Helicopter Systems
Rockwell Space Systems Division (SSD)
Telogy Inc.
United HealthCare Corp.

1995

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Commonwealth of Massachusetts
PCs Compleat Inc.
Hyatt Hotels & Resorts
Caterpillar Inc.
Kmart Corp.

1994

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Complete Health Services Inc.
Los Angeles County Department of Public Social Services
AT&T Universal Card Services Corp.
Chicago Bureau of Parking
South Florida Water Management District

1993

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Medical Center of Delaware
Texas Instruments
Lone Star Gas Co.
Travelers Managed Care and Employee Benefits Operations

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EXE TECHNOLOGIES

Emerging Technology

VPN to look for a firewall product that provides built-in tunneling capabilities. "There are many products to choose from. A high-end solution would be something like Sun Microsystems Inc.'s SunScreen, a hardware-software product that allows multiple tunnels to various places on the Internet and provides a good, solid pipe to your trading partner." A less-costly approach, says Burdick, would be to use an all-software solution. He cites Raptor Systems Inc.'s Eagle firewall as a quick and easy way to establish a tunnel through a GUI to connect with a trading partner that has compatible software.

All-in-one e-commerce security solutions are also beginning to appear on the market. For example, New Oak Communications of Acton, Mass., recently introduced the NOC 4000 Extranet Access Switch, which combines firewall, tunneling, encryption, authentication, bandwidth, routing and centralized management in a single Internet access box. "This kind of integration may be a harbinger of things to come in electronic commerce security," says Smyth.

Although firewalls and tunnels are critical e-commerce tools, organizations should remain alert to potential threats and not find themselves lulled into a false sense of security. "There are limits to the perimeter protection offered by a firewall," says Klaus. "A firewall won't prevent internal hacking from employees, contractors and other people onsite," he notes. "Also, when you open a VPN to your business partners, you're exposing your organization to your partners' security shortfalls."

To guard against VPN security threats, Klaus suggests that managers implement the usual array of intrusion safeguards, such as requiring users to regularly change their passwords and terminating access privileges of departing employees. He also recommends that organizations operating VPNs establish an intrusion detection system—specialized software that sits at the end of a tunnel and monitors exactly who is trying to gain access to the VPN and where that person is headed once he or she passes through the firewall. "It's becoming increasingly important to quantify the threat against firewalls," says Klaus. "There are a lot of companies out there that just don't know how often they're being attacked. They live in blissful ignorance until the worst happens."

Don't Stop Thinking About Security

In the future, VPN adopters may be able to protect themselves against a business partner's security shortcomings by checking the organization's security rating. Klaus notes that security vendors and consultants have started to lay the groundwork for a ratings system that would require organizations to

"You may have an extremely secure lock on your home's front door, but it's useless if you don't use it properly."

—Win Treese

prove they have taken the steps necessary to safeguard their computer systems from both internal and external attacks. "This type of system is still at least a few years out, but a widely supported ratings structure would help to calm everyone's nerves and make VPNs a more attractive technology," notes Klaus.

In the meantime, CIOs must remain vigilant to the ever-changing nature of e-commerce security. "When it comes to security, many CIOs make the mistake of believing 'once implemented, always implemented,'" says Poore. "But that's only true if you have a static environment. In a dynamic situation, such as with electronic commerce, assessing and improving security safeguards is a never-ending process." **CIO**

John Edwards is a technology writer based in Mount Laurel, N.J. He can be reached at EdWords@prodigy.net.

LEADING

EDGE

Spilling the JavaBeans

IT WOULD BE A WHOLE LOT EASIER to sketch a diagram of Netscape Communications Corp.'s new suite of Internet, intranet and extranet development tools, but since that's not possible, words will have to suffice. Currently shipping, Netscape's SuiteTools 2.0 encompasses two development tools: **Visual JavaScript Pro 1.0** and **Component Builder 1.0**.

Designed for building and testing applications, Visual JavaScript Pro 1.0 contains Visual JavaScript 1.0 (a rapid development tool), a test version of Netscape's Enterprise Server 3.0, a personal SQL database and a JavaScript debugger. Within Visual JavaScript Pro, developers can drag and drop JavaBean components from Netscape and other companies, including Symantec Corp., Sun Microsystems Inc., Marimba Inc. and Borland International Inc., to create database-enabled applications. Supported databases include those from Oracle Corp., Sybase Inc., Informix Software Inc., IBM Corp.'s DB2, Microsoft's SQL Server and those that are ODBC-enabled.

Designed for building application components, Component Builder 1.0 contains Symantec's Visual Café 2.0 for building JavaBean components, Acadia Software Inc.'s JSBean Builder for building JavaScript components and Netscape's Component Developer's Kit for building CORBA components. See where a diagram would have come in handy?

SuiteTools 2.0 is part of the Netscape One platform for building, deploying and managing Web applications. It's priced at \$995 per developer seat, with its components available individually as well at various per-developer-seat pricing. Contact Netscape at 650 937-2555 or at developer.netscape.com/program/index.html.



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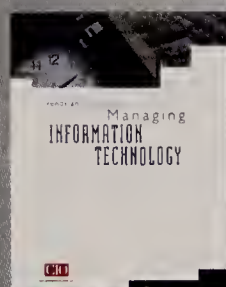
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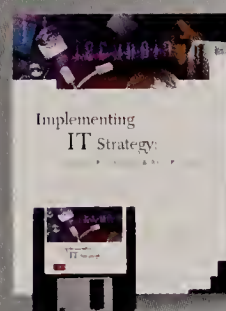
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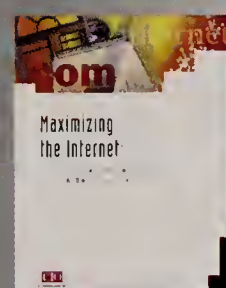
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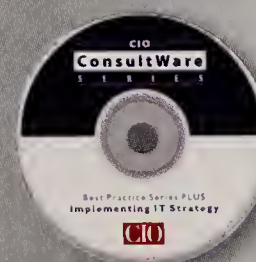


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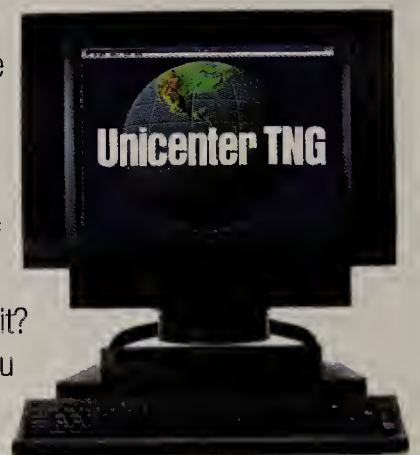


Your Choice.

Features	Unicenter	IBM/Tivoli TME 10
Business Process Views™	✓	
Real World Interface	✓	
Fully Integrated Management Functions	✓	
Fully Integrated Network Management	✓	
Policy-Based Management for All Functions	✓	
Manages Over 30 Platforms	✓	
Also Manages AIX, AS/400, OpenVMS, and MVS	✓	
Open and Interoperable	✓	✓
Published APIs for Over 14 Management Functions	✓	
Object-Oriented Enterprise Management Schema	✓	
Intelligent, Autonomous, and Lightweight Agents	✓	
Built-In Security	✓	
Single Sign-On	✓	
Network Security Including the Internet and Intranets	✓	
Monitoring and Event Management	✓	✓
Support for SNMP and HMMP/HMMS Standards	✓	
Virus Protection	✓	
Desktop-to-Host Storage Management	✓	
Software Delivery	✓	✓
Integrated Service Desk	✓	
Workload Management	✓	
Complete Job Flow Process Visualization	✓	
Extensive Web Server Management	✓	
Output Management	✓	
Resource Accounting	✓	
Integrated Support for MVS Management	✓	
Supports DECnet, TCP/IP, SNA, and, IPX/SPX	✓	
Wizards for Easy Customization	✓	

This simple chart only begins to explain the enormous difference between Unicenter® and IBM/Tivoli TME 10.

What clients want today are complete solutions not just software initiatives like SAA, OfficeVision and SystemView. The questions are, do you want to bet your career on IBM's view of the future? Can you afford to wait? And how can you have confidence in a solution that is so IBM-centric and biased?



Those are just a few reasons why thousands of clients prefer Unicenter. It's the industry standard for network and systems management. Today, more than 93% of the Fortune 500 and thousands of small to medium-size businesses trust CA for enterprise management.

Unicentered

Unlike TME 10, Unicenter® TNG™ supports every major hardware platform and operating system. It's open, scalable, extensible, and vendor-neutral. And with Unicenter TNG's powerful new features like advanced agent technology and Real World Interface™, Unicenter TNG is light-years ahead of TME 10.

It's real, it's mission-critical, and it's up and running in thousands of sites around the world.

If that sounds good to you, remember, it's your choice.

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